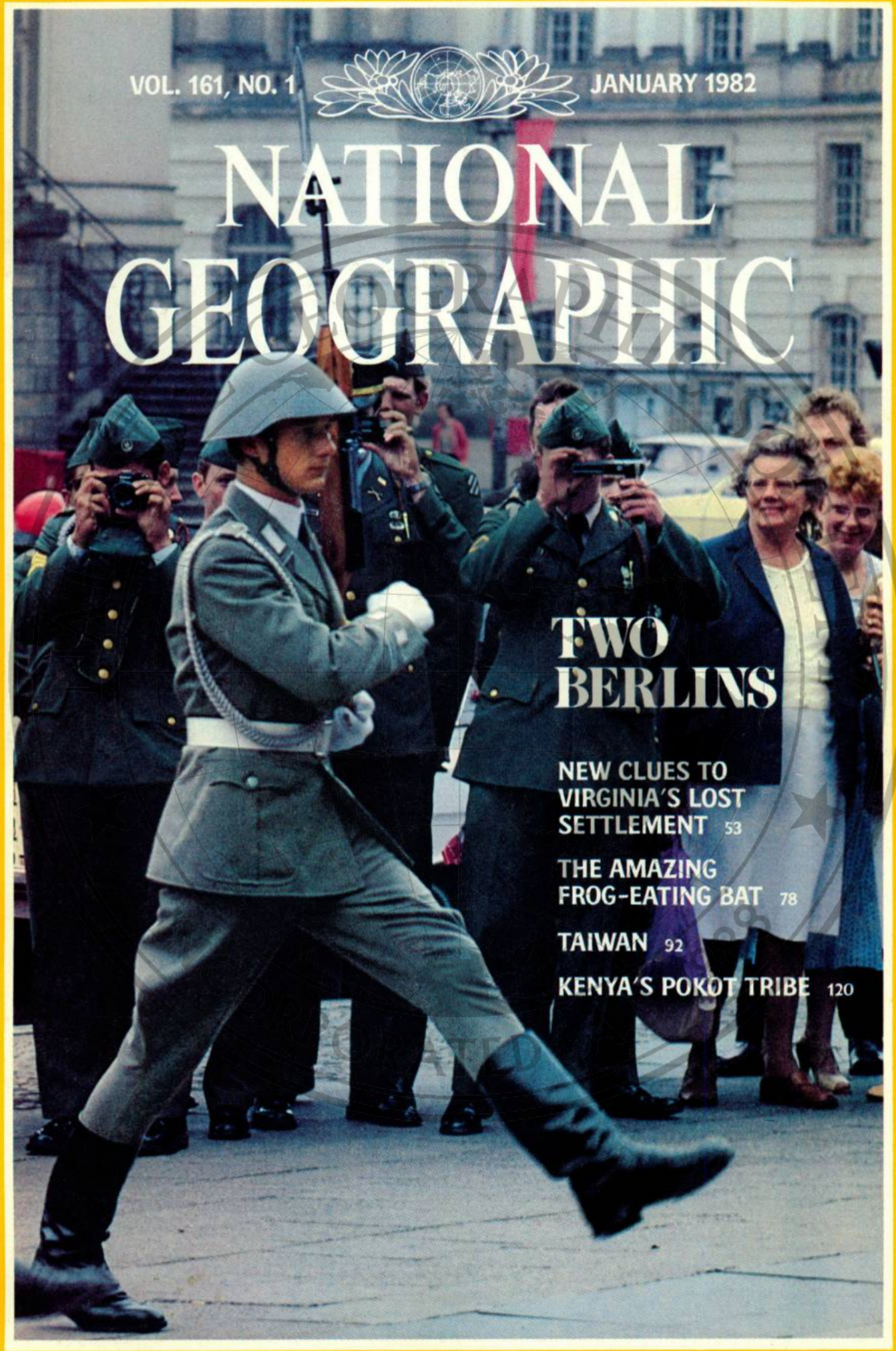
VOL. 161, NO. 1 JANUARY 1982

NATIONAL GEOGRAPHIC



TWO BERLINS

NEW CLUES TO VIRGINIA'S LOST SETTLEMENT 53

THE AMAZING FROG-EATING BAT 78

TAIWAN 92

KENYA'S POKOT TRIBE 120

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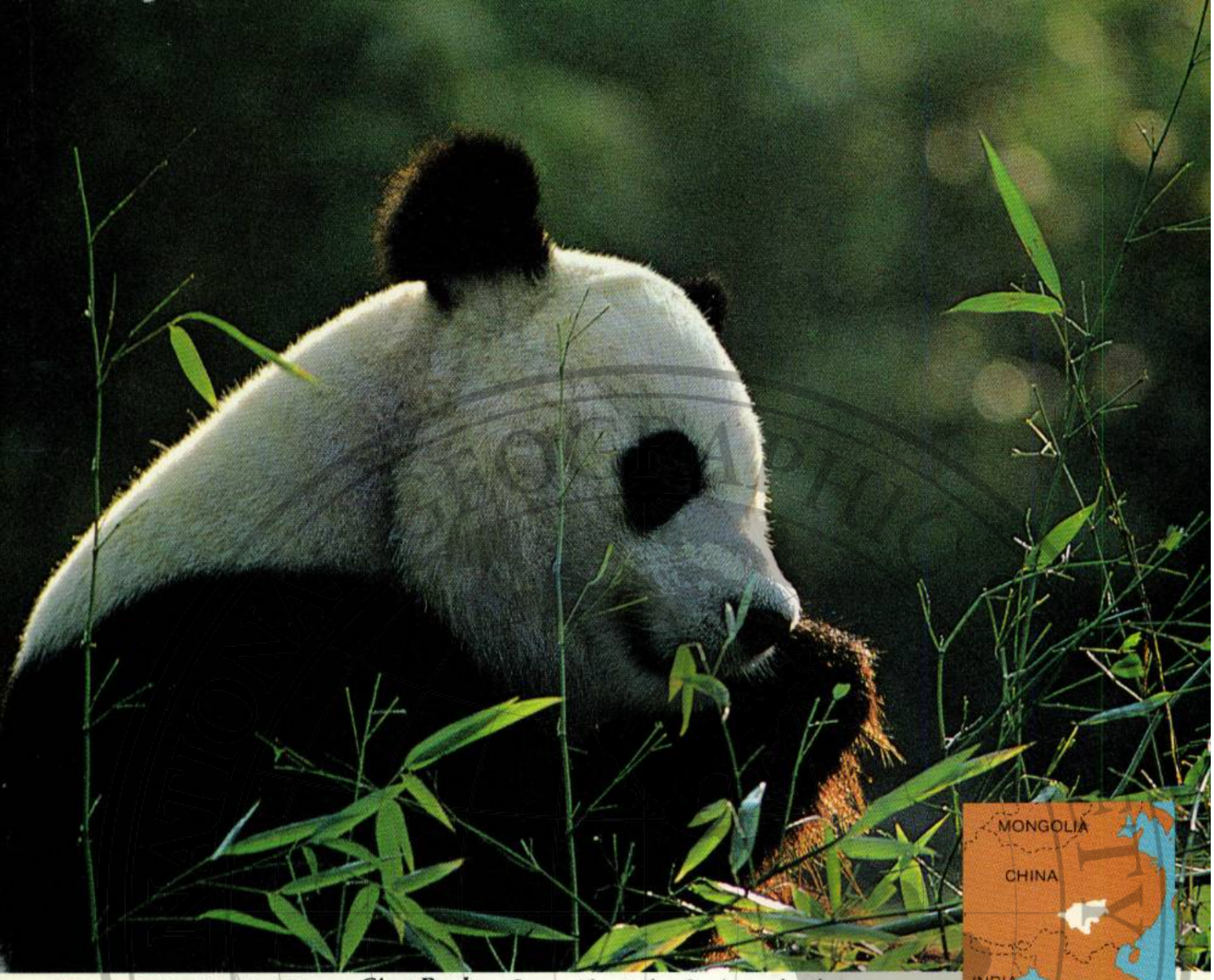

Photographed by Jean-Paul Ferrero ***Giant Panda:*** ***Genus:*** *Ailuropoda* ***Species:*** *melanoleuca*
Adult weight: *Male—up to 136kg; female—approximately 113kg* ***Adult length of head and body:*** *152—183cm* ***Habitat:*** *Mountain forests in central China where bamboo, its main food, can be found*
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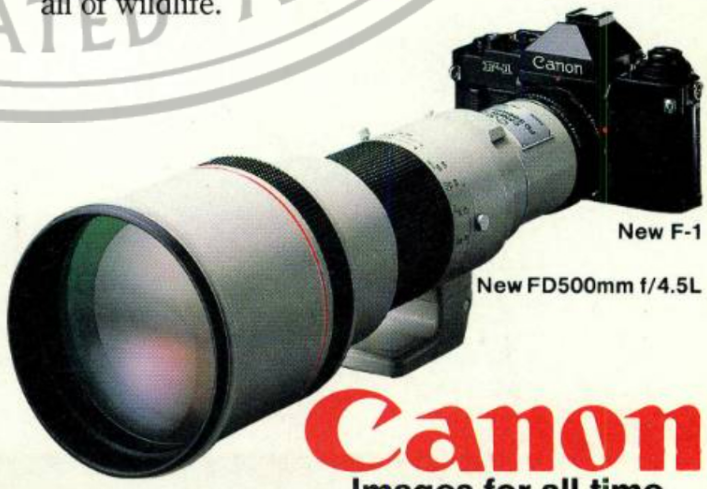

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Desert find yields new early mammal

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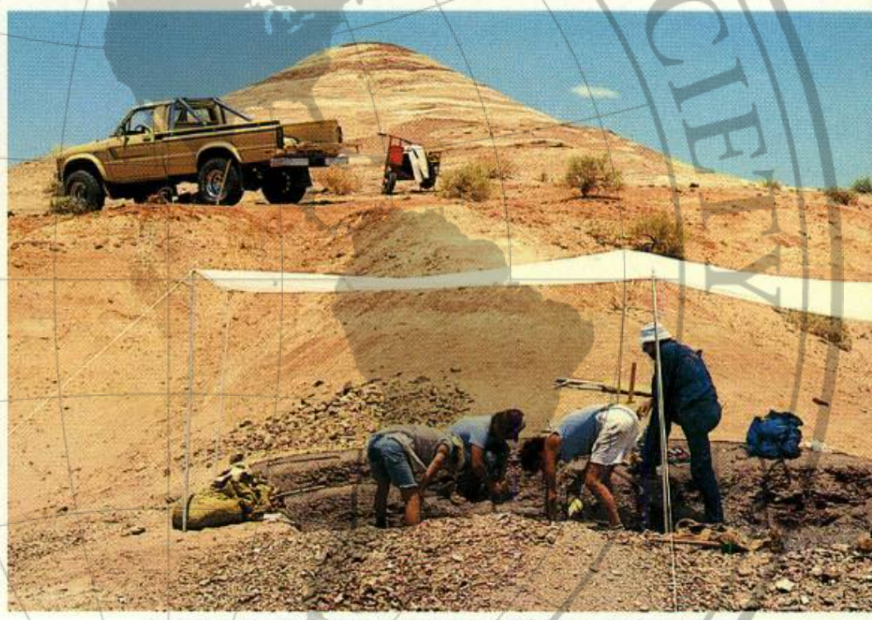

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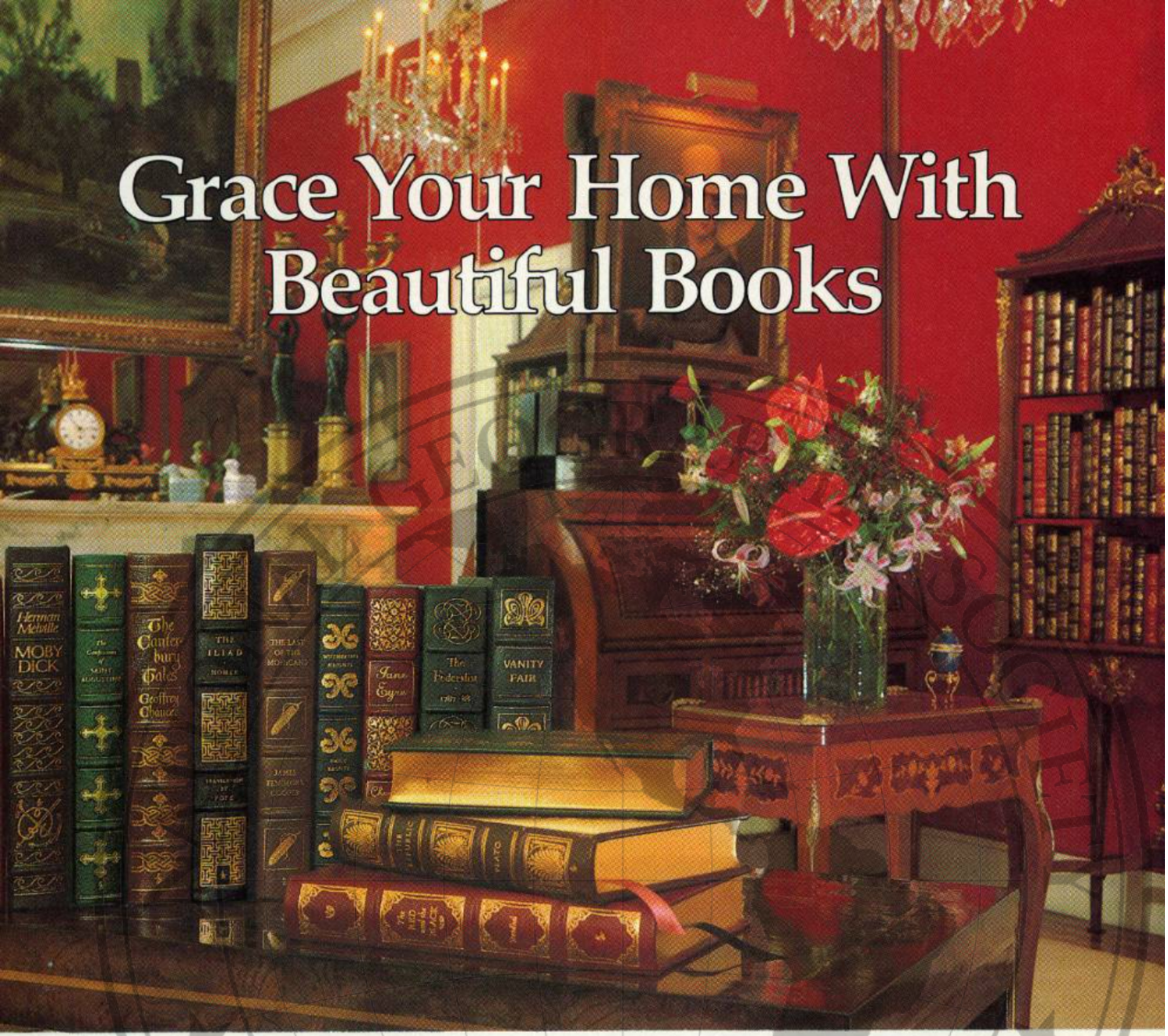

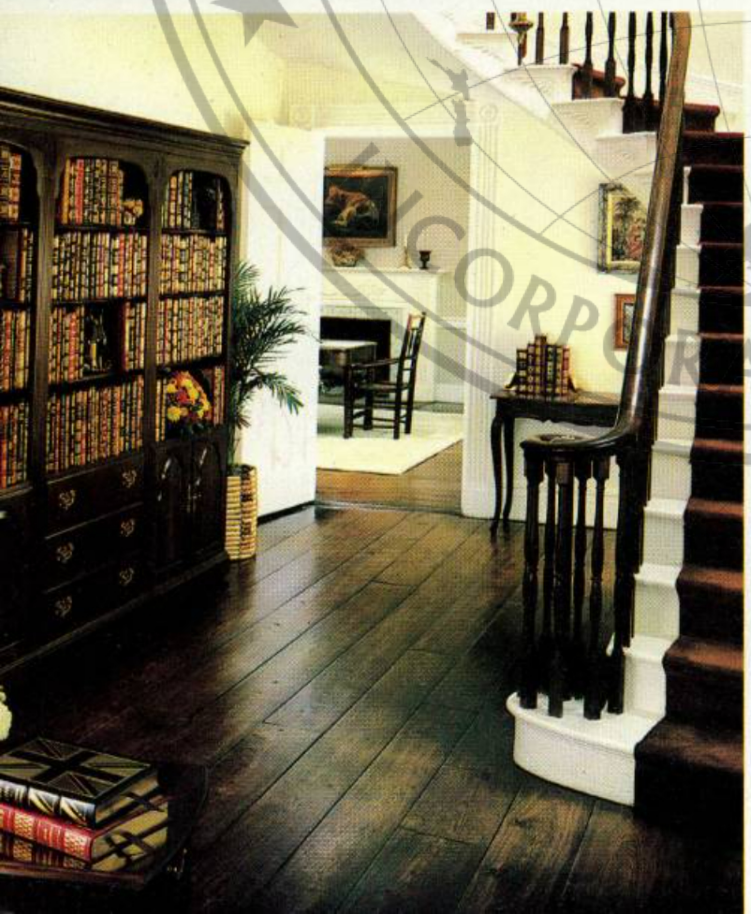

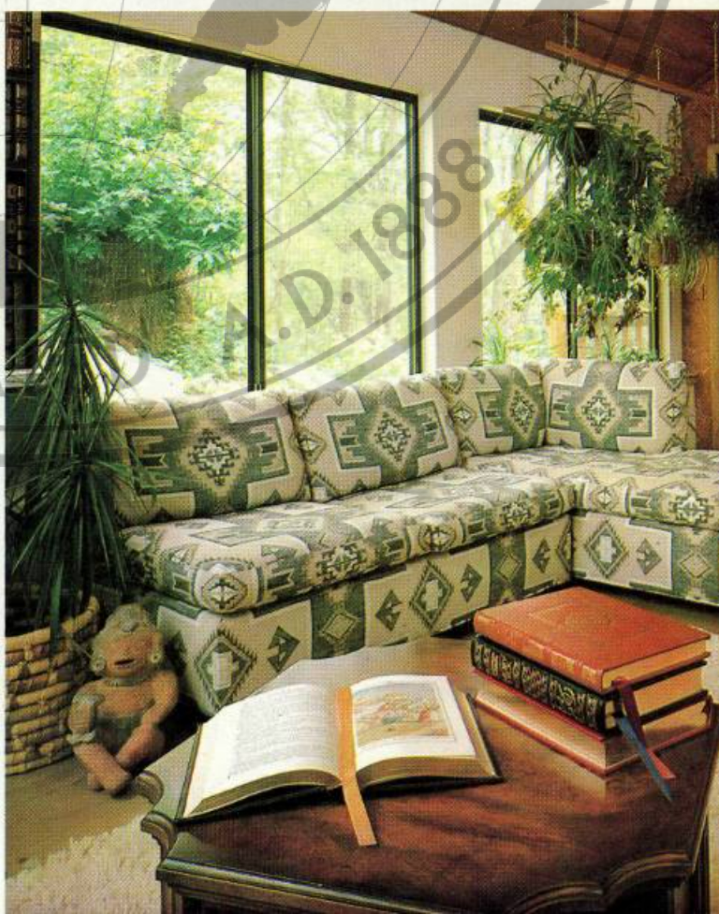

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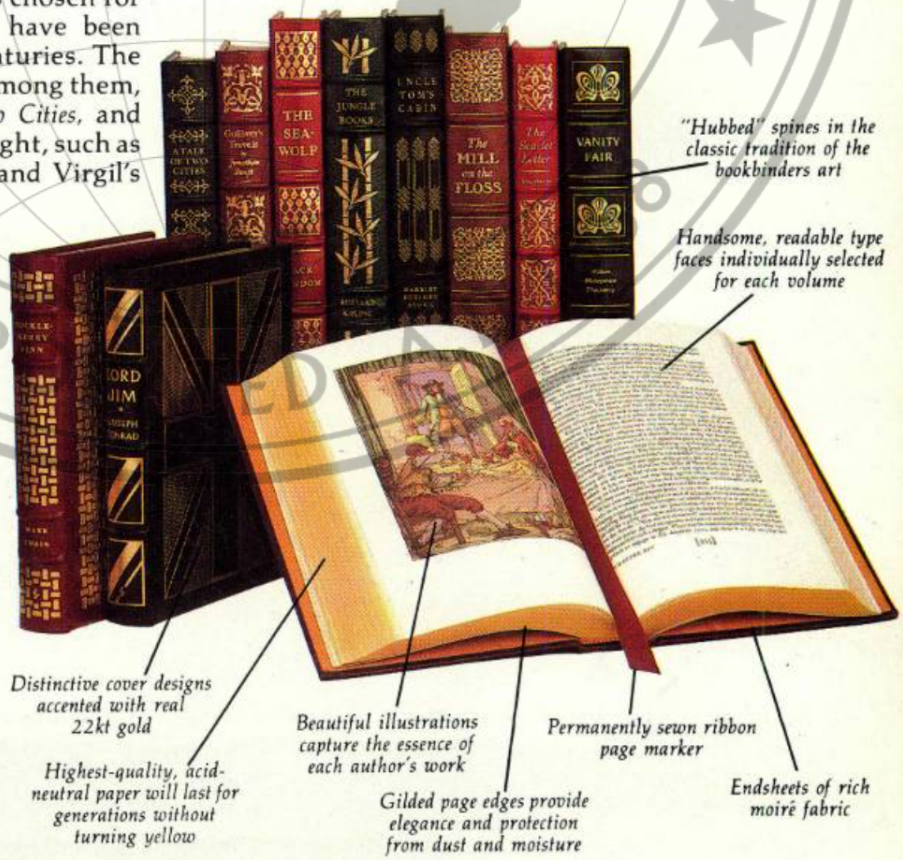
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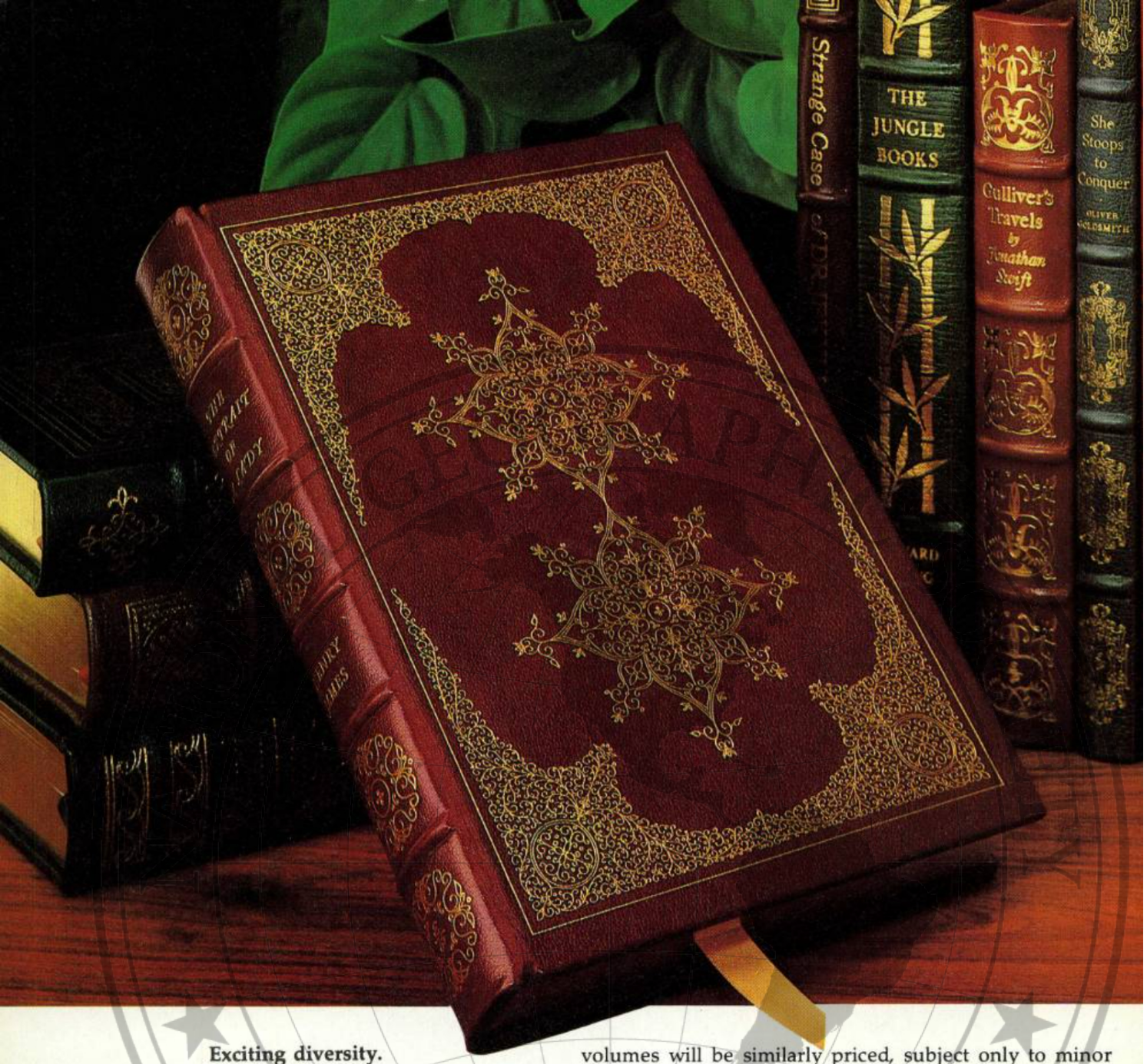

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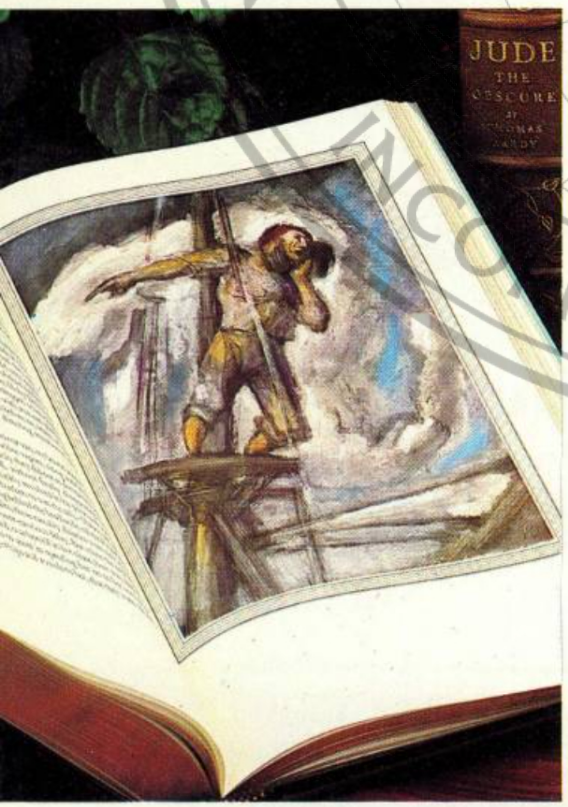

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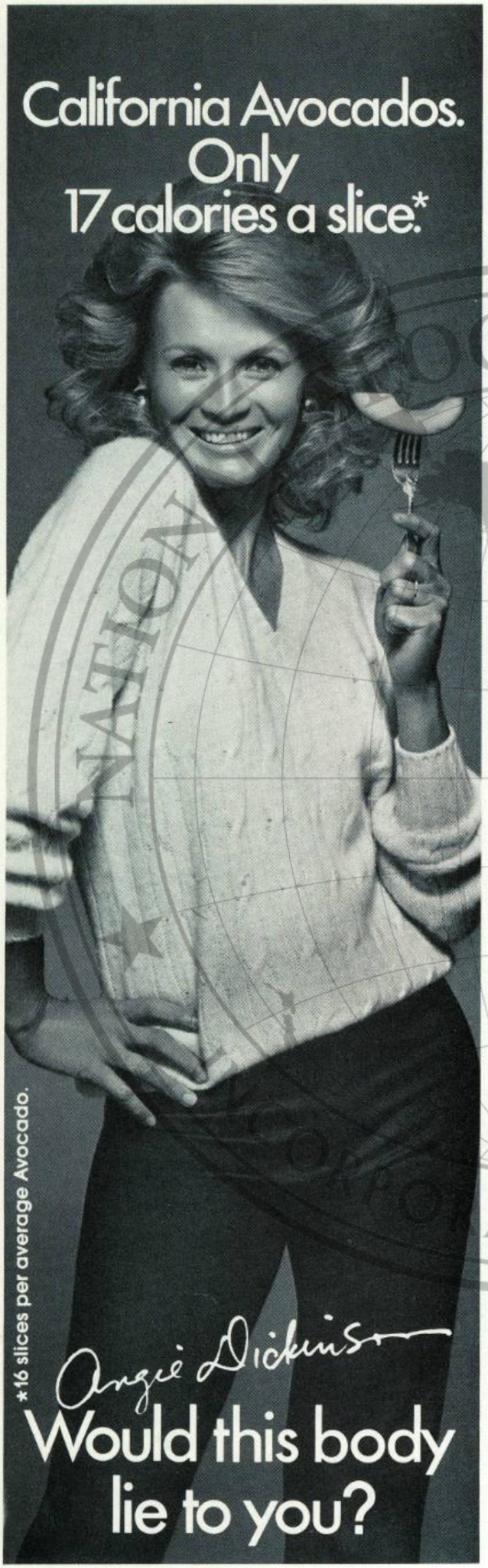

Members Forum

SPACE SHUTTLE

"Columbia's Astronauts' Own Story" was magnificent. From that first sunrise on the launchpad through the uncertainty of lift-off, you felt that you were right with them.

Elizabeth Spear
Woodstock, Vermont

The article by Tom Wolfe mentions "the flight engineer, a good old boy from Oklahoma named Jack Ridley." This implies some sort of mechanic whose only contribution was the broomstick he gave Yeager as a lever.

Jack Ridley was a major in the Air Force, had a master's degree in aeronautical engineering, and was an accomplished flight-test pilot in his own right. The "right stuff" isn't limited to the pilots. Many of the behind the scenes flight-test engineers made it possible for the good old boys to make the big time.

Vern Prentiss
Lt. Col., U. S. Air Force (Ret.)
Corona del Mar, California

Mr. Young's assertion that we are not far from going to the stars sounds Buck Rogersish.

A spacecraft traveling at 1,000 times the speed of the astronauts on their way to the moon (15 million mph) would require 192 years to reach Proxima Centauri, the very nearest star.

John Zueblin
Carmel, New York

Indeed, by today's technology it would take a long time for man to reach even the outer planets. But stargazing first led man to escape earth's bonds. Surely we can allow astronaut John Young some poetic license to dream of venturing to the stars.

EVEREST CLIMB

Though remarkable, Messner's solo climb of Mount Everest was absolute madness. Rule number one for all climbers is not to go alone! I cannot tip my hat to Mr. Messner for his foolishness.

Nora Rogers
Palo Alto, California

Reinhold Messner! I write not to detract but to question. What can the GEOGRAPHIC offer as proof of Messner's self-acclaimed achievements? Is the photo of the tripod conclusive, in your opinion?

K. B. Johns
Arlington, Virginia

Not one but several knowledgeable climbers have no doubt that Messner, an outstanding mountaineer, reached the summit of Everest. And the tripod confirms it.

INDIAN OCEAN

The bust at the left of the picture on page 437 is not a bust of George V of England. I think you will find it to be a bust of Lord Kitchener.

V. O. Marquez
St.-Lazare, Vaudreuil, Quebec

The Seychelles government identified these busts of the British monarchs, now being stored pending renovation of a museum. Buckingham Palace says the hairline, mustache, and decorations appear to be those of George V.

NAHANNI

What a pleasant surprise to open my first copy of NATIONAL GEOGRAPHIC to Douglas Chadwick's article about the Nahanni wilderness park. I have had glimpses of natural, breathtaking beauty.

Ada G. Sanderson
Falls Church, Virginia

I am writing to express my dismay at certain aspects of "Nahanni: Canada's Wilderness Park." In several instances the author deals with the background of exploration and personages who have frequented the area from time to time.

I am totally amazed that the author overlooked a September 1963 expedition of four Canadian Army personnel who traveled up the Nahanni, portaged Virginia Falls, went on to Rabbitkettle Hotsprings, and subsequently returned to their starting point at old Fort Nelson.

Capt. Christopher C. Smith
Canadian Forces Base
Edmonton, Alberta

GEOGRAPHIC READERS

I was surprised to read in the September 1981 NATIONAL GEOGRAPHIC that its readership had reached 35 million. In your December 1977 issue you noted that membership had risen to ten million. As such a gain in readers seems unlikely, I am wondering if it was a misprint.

Robert Shaw
Port Williams, Nova Scotia

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MAYA ART

I am troubled over the article concerning Maya art treasures. On page 233, the author laments damage done to the drawing of a drummer. He then shows two different drummers, with only scant similarities.

Ronald G. Helma
Adrian, Michigan

The drummers are the same; the photograph taken after the vandalism is a close-up.

MONO LAKE

Mono Lake is indeed a victim, but of natural evolution rather than sinister plots. The theory of evolution proclaims that the stronger species shall dominate. Mankind should not be excluded from the ever changing equation labeled "natural balance."

James H. Benson
Altadena, California

The article referred to the Salton Sea as the protein-rich lake that birds may go to when Mono Lake no longer can provide for them.

Most people are unaware that the Salton Sea is in trouble itself. Proposals for geothermal development and water conservation may drop the sea's level by 14 feet and salinity may zoom to more than one hundred thousand parts per million within ten years. This will destroy the fishery, much of the zooplankton, and have a devastating effect on many of the 300 species of birds that inhabit the Salton Sea.

J. M. Ritter, Chief Ranger
Salton Sea State Recreation Area
North Shore, California

The article on Mono Lake in the October 1981 issue was very interesting, but it raised some questions. On page 504 it states "today its water is two and a half times as salty as the ocean. Ironically the undrinkable lake is dwindling further to feed the faucets of Los Angeles. . . ." Surely the people of Los Angeles are not drinking salt water. Is the lake water desalinated?

Sterling P. Backus
Clarkston, Washington

Los Angelenos are not drinking salt water. As we say in the following sentence, most of the streams that once fed the lake are now diverted to aqueducts before they reach Mono Lake.

APHRODISIAS

If the history texts of my youth had been written in such clear poetic narrative, my present mind's eye view of the past would now be less blurred.

Anne R. Woodruff
Hamilton, Montana

SILVER

In June of this year I was a patient in the burn unit at University Hospital in Ann Arbor, Michigan. The silver sulfadiazine to which you refer in your article was used, and it is a lifesaver.

Mrs. Robert Wingett
Muskegon Heights, Michigan

In your article you gave the impression that Potosí is in Peru. Potosí and the Potosí mint, now a museum, belong to Bolivia.

Martin Inchauste Echazu
Kentwood, Michigan

Potosí is now in Bolivia, but Mr. Boraiko was writing of the silver mined after the Spanish conquest, when the mountain was part of the viceroyalty of Peru, as he states.

As something of an aficionado of word usage, I inquire about a line on page 285 of the September 1981 issue. It is stated that a silversmith can "beat it into a leaf nearly 150 times thinner than this page." Something in me rebels against the use of a whole number to express a reduction. (Would I say "I am twice as thin as he"?) My sense of propriety requires "nearly 150th the thickness of this page."

Robert B. Rosenthal
Mason City, Iowa

You are twice as right.

SOLAR SYSTEM

The chart included with the July issue is really fantastic. It makes my old charts seem ancient.

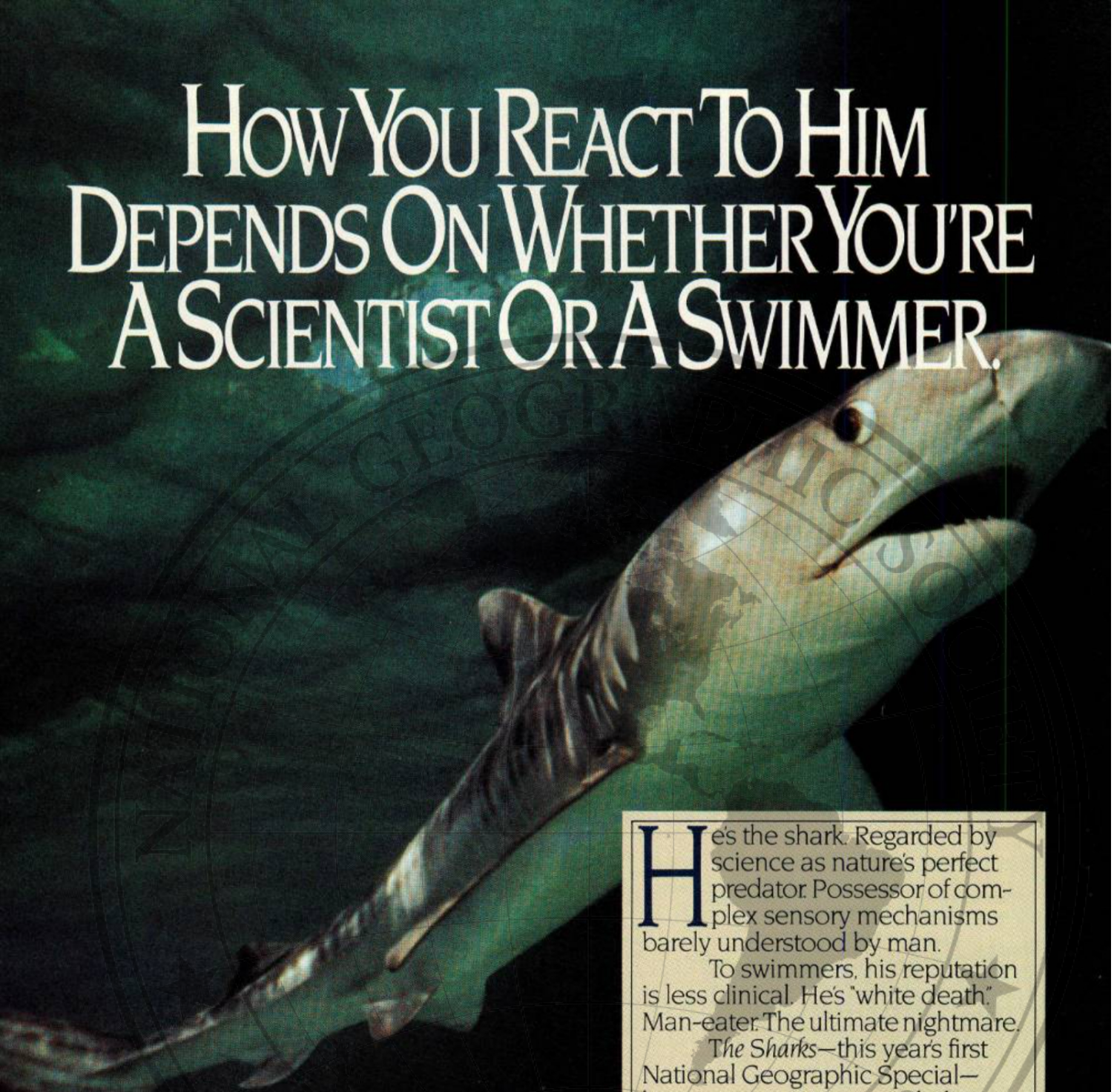
I am 66 years old and still make a valiant attempt to learn two new facts every day. (In five years, that's 3,650 new facts added to my knowledge.)

Rody J. Clutter
Pittsburgh, Pennsylvania

Mr. Clutter, we are impressed.

Letters should be addressed to **Members Forum,** *National Geographic Magazine, Box 37448, Washington, D. C. 20013, and should include sender's address and telephone number. Not all letters can be used. Those that are will often be edited and excerpted.*

How You React To Him Depends On Whether You're A Scientist Or A Swimmer.



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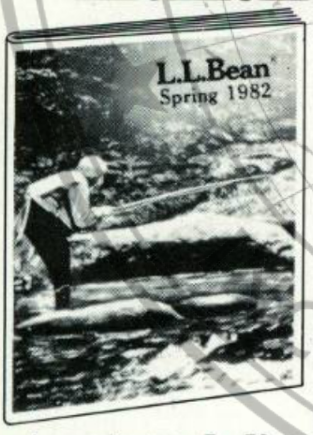

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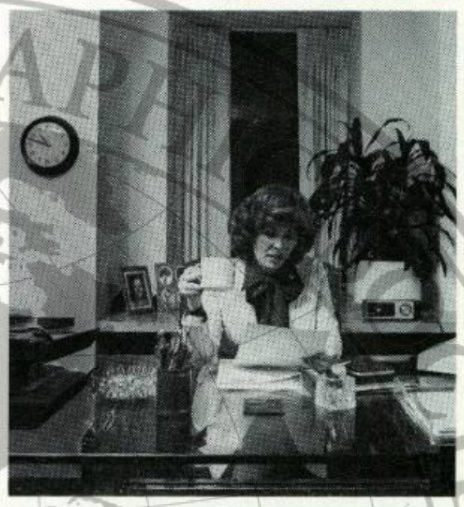

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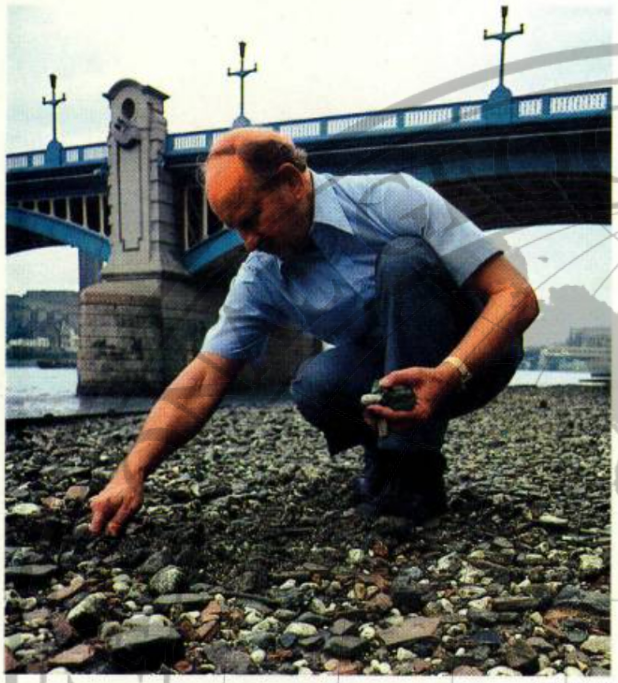


IRA BLOCK

IN THE ACTIVE IMAGINATION of young Londoner ***Ivor Noël Hume,*** nothing seemed more exciting than to become an Egyptologist. "When I told my guardian, he said, '*That* is an avocation, not a profession,' " recalls the man who became resident archaeologist of the Colonial Williamsburg Foundation.

To corroborate some artifacts from the lost settlement of Wolstenholme Towne, Noël Hume dived on a wreck off Bermuda. Once, unexpectedly, his air tank ran dry.

"I tried to ascend slowly," says Noël Hume. "When the sun came out, I thought I'd reached the surface and took the regulator out—and I still had seven feet to go."

Exhausted, he surfaced 40 yards from the support boat and waved for his wife, Audrey, the project's historian, to throw him a line. "She couldn't hear me, thought I was fine, and just smiled and waved back," he says. Which only goes to show that sometimes archaeologists have to make a lot of noise before the world listens to them, and endure a good deal of trauma to painstakingly prove their points.

WHILE A SCHOOLBOY in California, ***Merlin D. Tuttle*** flunked the fifth grade. "I was spending too much time studying bats and other small mammals," he says. Dr. Tuttle also became a falconer, expertise he applied when training caged bats in Panama.

"There was one bat I had worked with for a couple of days and then released," he recalls. "Later the same bat suddenly appeared out of the forest and tried to land on my hand in hope of a meal."

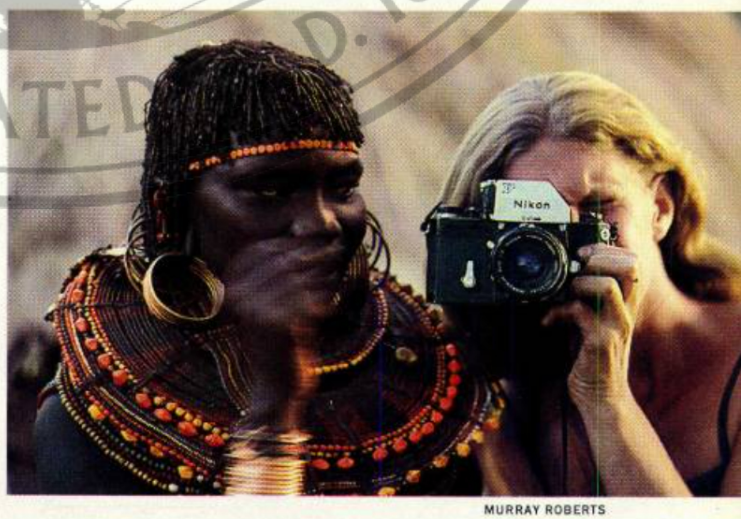
Dr. Tuttle is now in Thailand working with conservationists to protect the world's smallest mammal, Kitti's hog-nosed bat, which is about the weight of a large bumblebee.

SOMETIMES being a scientist can make you more of an expert than you realize, according to ***Elizabeth L. Meyerhoff,*** who recently spent six years living with the Pokot people of Kenya.

"I was watching an initiation ceremony," she recalls. "Pokot rituals have certain designated events, but the sequence often changes. I turned to an old man and asked what was going to happen next. 'You've been here so long,' he replied, '*you* tell *us*.' "

California born, Meyerhoff was an art student at UCLA until she attended an anthropology lecture by the late Dr. Louis S. B. Leakey. Now she is completing her doctorate on Pokot women at Cambridge University in England and plans to return to Kenya.

"I would like to do something practical," she says. "Perhaps a medical program combining Pokot traditions with modern medicine."



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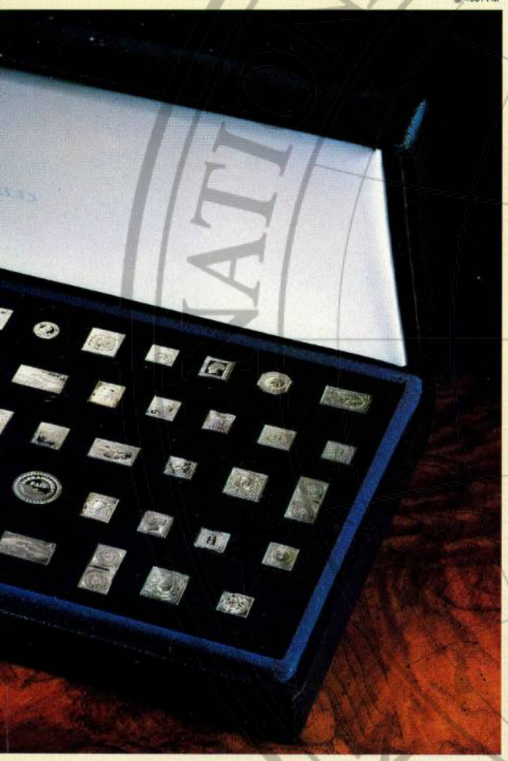

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The Western Australia "Inverted Swan" of 1854 shows the central design of a swan upside down, and was a printing error. However, very few of these stamps exist today, probably less than 20. As a result it is valued at approximately $100,000 on the collector's market.

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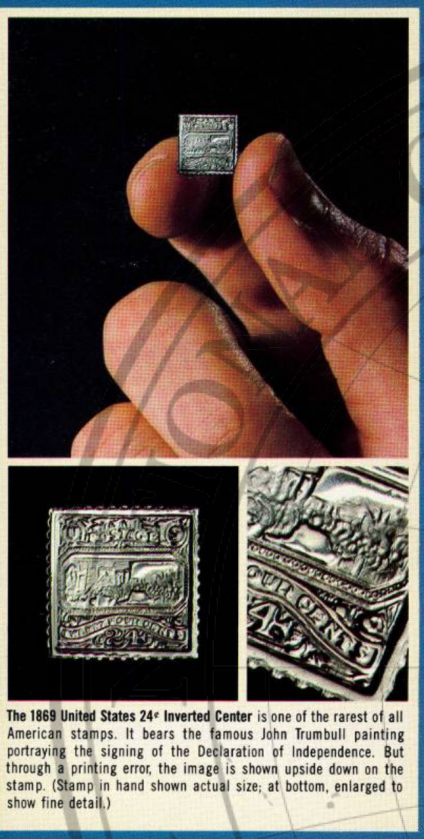

The 1869 United States 24¢ Inverted Center is one of the rarest of all American stamps. It bears the famous John Trumbull painting portraying the signing of the Declaration of Independence. But through a printing error, the image is shown upside down on the stamp. (Stamp in hand shown actual size; at bottom, enlarged to show fine detail.)

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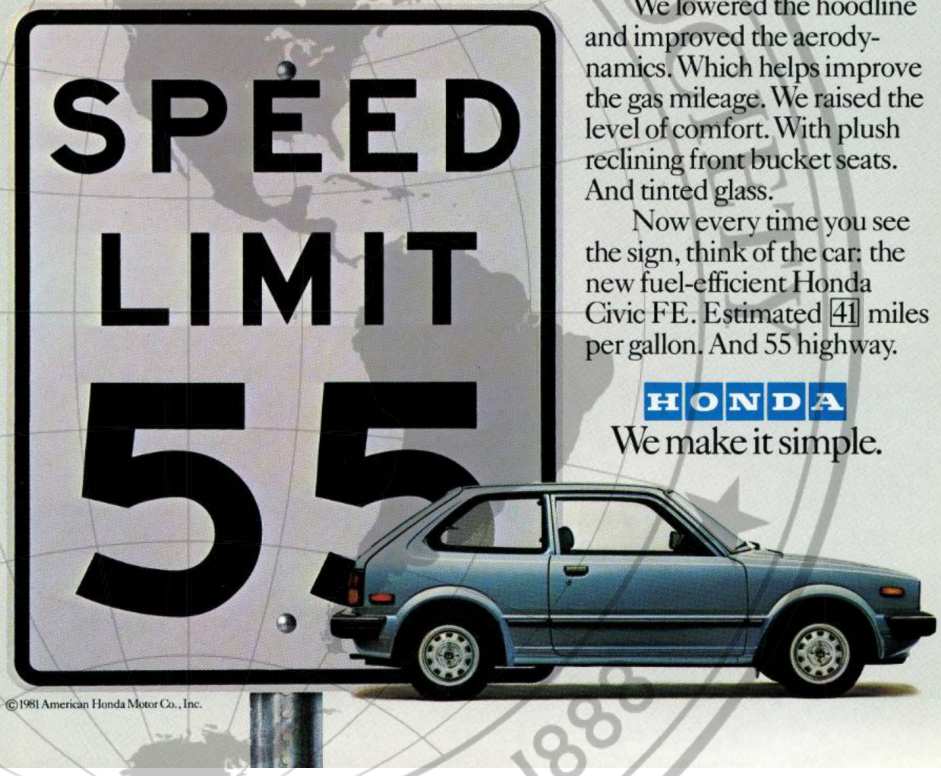

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HISTORY MAKES BORDERS, and borders often make history. From the time the barbarians swept down on the earliest civilized communities of the Tigris and Euphrates until today, a central political question of mankind has been—who owns what, and by what right?

The United States, bounded by two oceans and normally friendly borders, has not felt the full weight of the problem. But in a continent like Africa, where today's borders were drawn by yesterday's powers without regard to tribal and ethnic lines, the results are often nonsensical. Yet to change such borders would cause a new set of problems and troubles. Thus, different peoples who find themselves inside such an artificial border have little recourse but to seek a kind of nationhood, and that is the path most have followed.

The question of borders pervades this issue of the GEOGRAPHIC—between East and West in Berlin, between mainland China and the island of Taiwan, and on a border around Jamestown, Virginia, between white settlers and Indians. This last expanded continually westward for 250 years and was a frontier of friction and combat throughout. Land granted by a distant king was thought to be held by right of conquest. But the Indian was there, on what *he* thought was his own land.

Between the severed parts of the Third Reich there is not only a border but a barrier. Europe has lived with the Wall because there has seemed no peaceable alternative.

NATIONAL GEOGRAPHIC often tries to show both sides of a critical border, and sometimes we feel the effects of one. There are 60,000 Society members in West Germany, but only 39 in all East Germany.

Some years ago I visited Quemoy and Matsu, those fortified islands off the China coast, at a time when combat was in the air. That dangerous moment passed, and it appears now that this border may slowly yield to a noncombative solution.

Borders need not make wars. They can be means for cooperation and peaceful compromise. They can be made to work as parts of a grand scheme, as in the Sinai—to be the subject of an article in a forthcoming issue. The only certainty is that they will always be there.

Wilbur E. Garrett

EDITOR

NATIONAL GEOGRAPHIC

THE NATIONAL GEOGRAPHIC MAGAZINE VOL. 161, NO. 1

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January 1982

Two Berlins—
A Generation Apart 2

Thirty-six years after partition, historic Berlin seems permanently severed, with separate cities presenting—across the Wall—sharp contrasts in wealth, license, and ambition. Priit J. Vesilind and photographer Cotton Coulson visit both.

New Clues to an Old Mystery 53

Global detective work, aided by NATIONAL GEOGRAPHIC readers, helps archaeologist Ivor Noël Hume reconstruct the history of colonial Virginia's Wolstenholme Towne. Photographs by Ira Block and paintings by Richard Schlecht.

The Amazing Frog-Eating Bat 78

Armed with tape recorders and cameras, zoologist Merlin D. Tuttle discovers that a frog's love song can sound like a dinner bell to hungry bats on Barro Colorado Island in Panama.

Taiwan Confronts a New Era 92

Resilient, dynamic, and authoritarian, Taiwan—home of the "derecognized" Republic of China—continues its economic success story as it tests the shifting political winds. By Noel Grove, with photographs by John Chao.

The Threatened Ways of
Kenya's Pokot People 120

Anthropologist Elizabeth L. Meyerhoff lived for six years among Pokot farmers and herders of western Kenya. She and photographer Murray Roberts record their vanishing costumes and traditional rituals.

COVER: *Touring U. S. soldiers witness the changing of the guard at a war memorial in East Berlin. Photograph by Cotton Coulson.*

TWO BERLINS A

A THREE-PART REPORT BY
PRIIT J. VESILIND
SENIOR EDITORIAL STAFF

PHOTOGRAPHS BY
COTTON COULSON

Two World Wars marched across Europe from the proud capital of a unified Germany, the second leaving a shattered city mired in

Generation Apart

military zones and political stalemate. Today's Berlin remains the focus of divided Europe and a point where ideological foes meet face to face, as do these U. S. and East German troops at East Berlin's Memorial to the Victims of Fascism and Militarism.

3

The Wall

"WHAT WOULD HAPPEN," I asked, "if the Wall were taken down?" Erhard Krack, Mayor of East Berlin, thumped his fingers on the polished wood of his desk.

"What you are asking," he replied with agitation, "is a philosophic question. Let us get back to reality."

For Mayor Krack there were flats to build, potholes to fix, five-year plans to fulfill. The Wall, like the rising of the sun in the east, had become a fact of life.

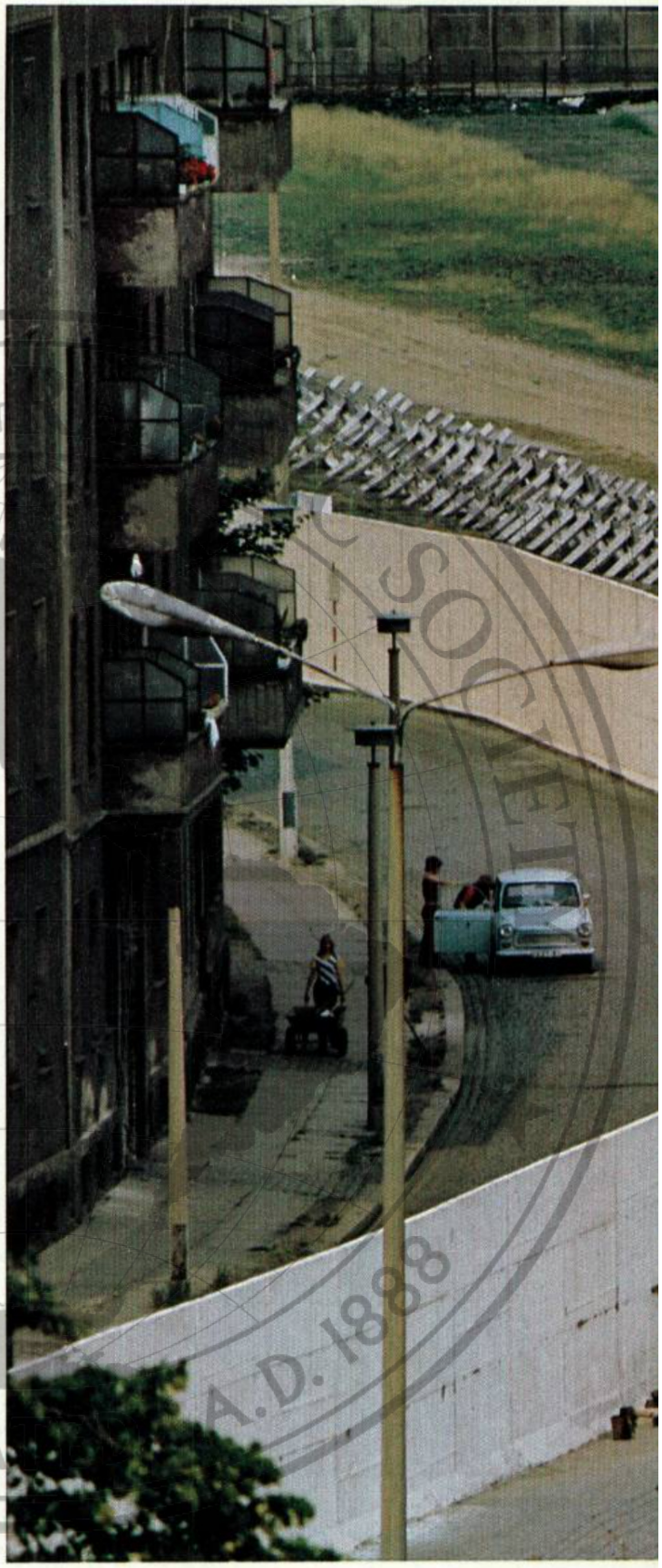
But I forced the issue, and he answered: "Personally, I don't think many of our citizens would go over to the West. Our people have a good life. . . . Those on the other side would come here and see that we have the superior system."

Two systems. Two German states. The gap between East and West Berlin seems ever deeper. Ten or 15 years ago, when the wounds of separation were fresh, one could have spoken of the "divided city." Today there is no such city, only an island called West Berlin, encircled by a resentful Communist capital and its nation, the German Democratic Republic (GDR).

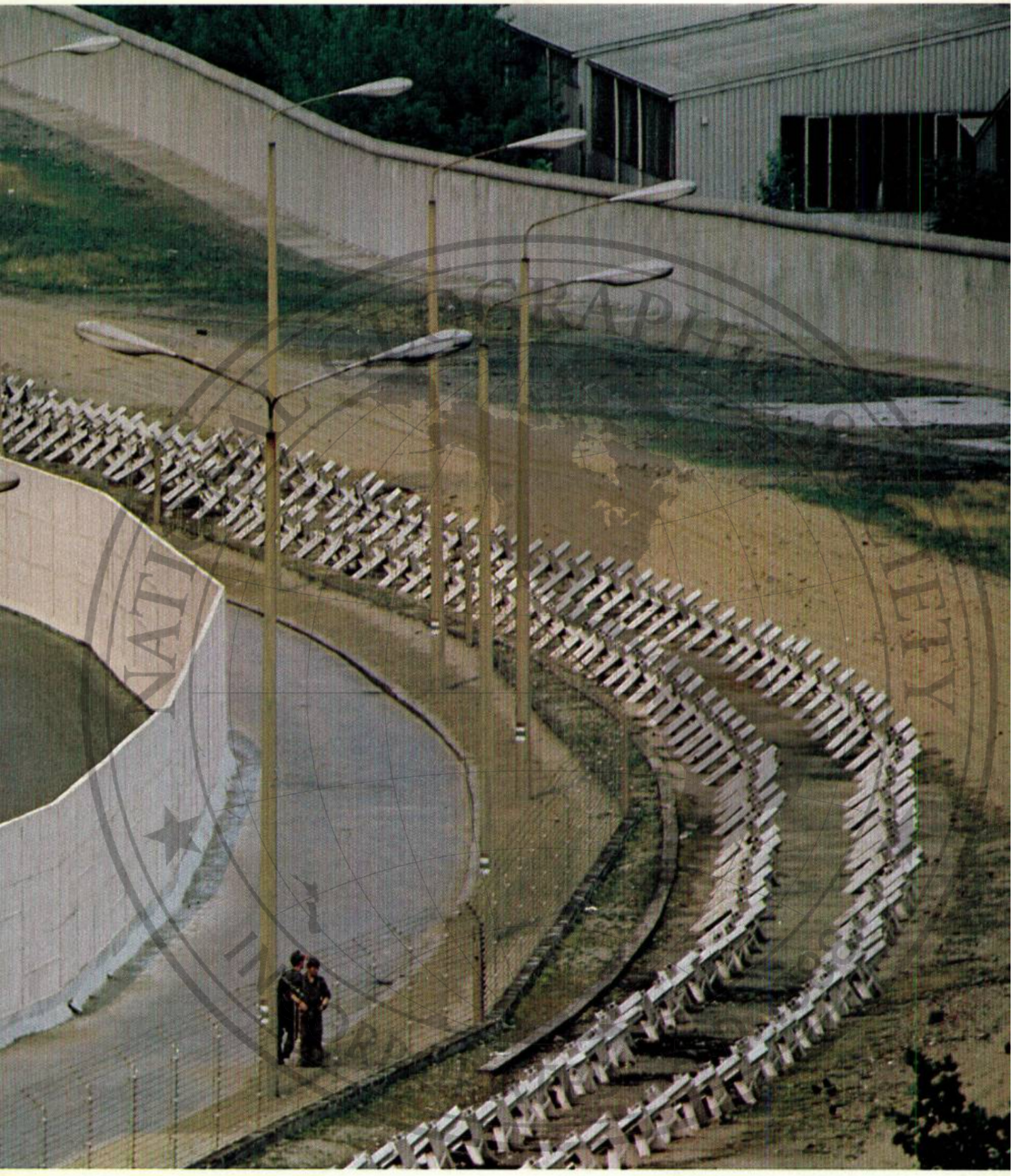
Perhaps the best way to sense the deep isolation of West Berlin is to drive, as I did, through East Germany—not on the four access highways that lead to West Berlin, but along the tree-bordered back roads and through the somber hamlets of the Prussian plain into the eastern city.

The capital of the GDR rises smoothly and naturally, from farm to suburb to tramline and city street, with only a simple sign to announce that you have arrived. On that chilly March evening, acrid with the smoke of brown coal, I walked down Unter den Linden, the only pedestrian on the storied main street of old Berlin. And, with only six policemen watching, I stood before the magnificent floodlit Brandenburg Gate, 18th-century symbol of Prussian military might, just east of the Berlin Wall.

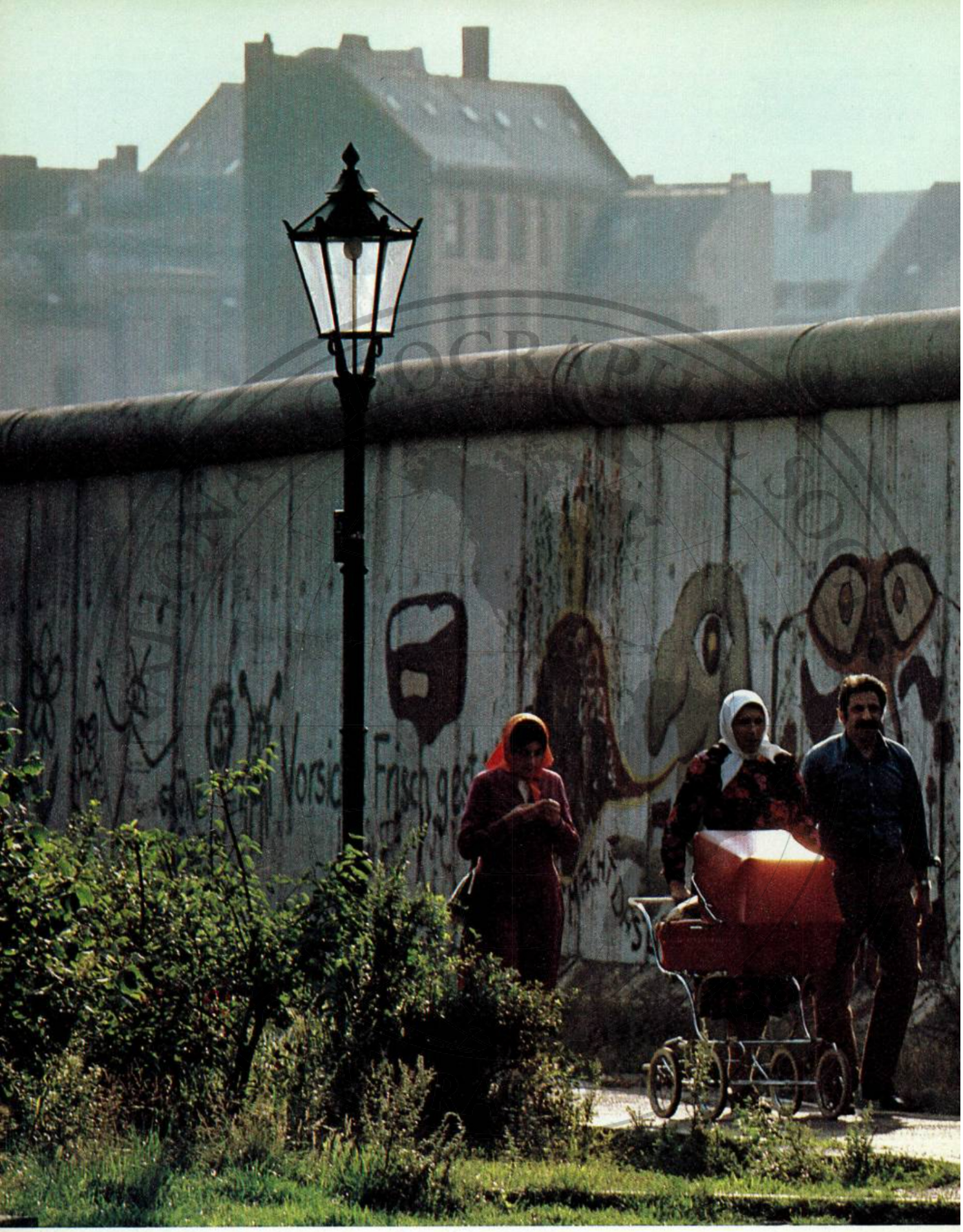
Beyond the gate, West Berlin glowed pink and orange against the clouds, and



The "death strip" *stretches like a barren moat around West Berlin, upper right, with 100 miles of electric fences, patrols, floodlights, and vehicle traps between inner and outer walls that*

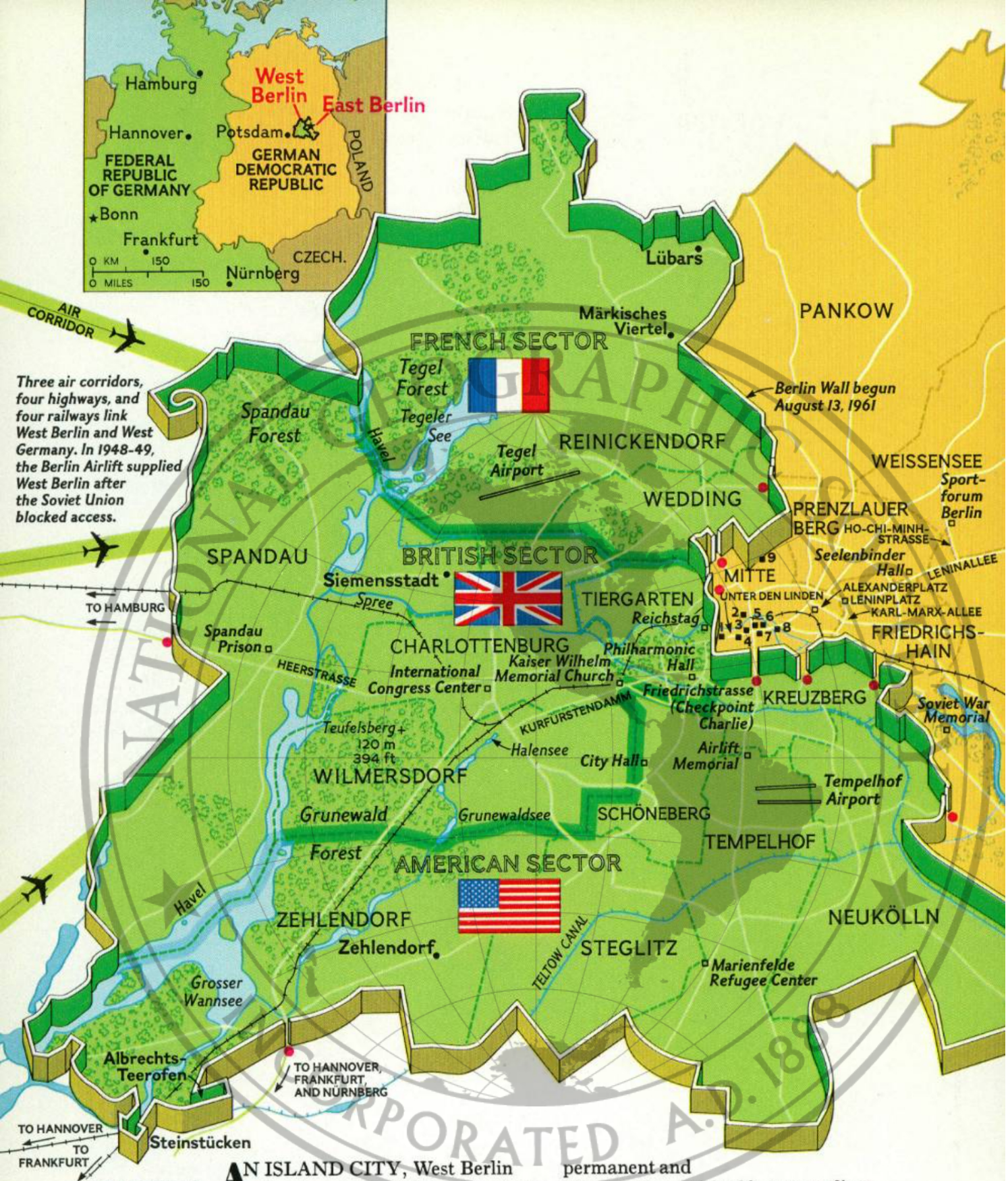


separate it from East Berlin and the German Democratic Republic (GDR). The "antifascist protective barrier," as the East calls the Wall, was erected by the GDR in 1961 to stem a mass exodus to the West—a loss of three million people that threatened the foundations of the new state. Today, with improved conditions in the East and a tougher barrier, few risk their lives to cross over.



Ignoring the Wall *has become the only sensible course for most West Berliners, such as this family of Turkish guest workers strolling in the district of Kreuzberg. Since the stabilizing 1971 Quadripartite Agreement, the Wall has become more of*

a tourist site than a flashpoint of confrontation. It also provides a handy forum for graffiti; the wishful thought lettered on the right may speak for many Germans: "Live alone and free, like a tree, but in the brotherhood of the forest."



WEST BERLIN

CITY FLAG OF WEST BERLIN

AN ISLAND CITY, West Berlin lies deep in the GDR, a hundred miles from the Federal Republic of Germany. Not a constituent part of West Germany, it remains under the protection of France, Great Britain, and the United States, who honor the four-power agreements that divided Berlin into four sectors. Now the occupation seems tediously permanent and West Berlin a spirited but struggling city dependent on funds from Bonn.

AREA: 483 sq km (185 sq mi). **POPULATION:** 2,177,000, about 9 percent foreign workers. **ECONOMY:** 40 percent of work force in industry—electrical equipment, engineering, tobacco products, chemicals, and textiles. **LAND USE:** 30 percent of land area is woods, lakes and rivers, or parklands; 7.5 percent is agricultural.

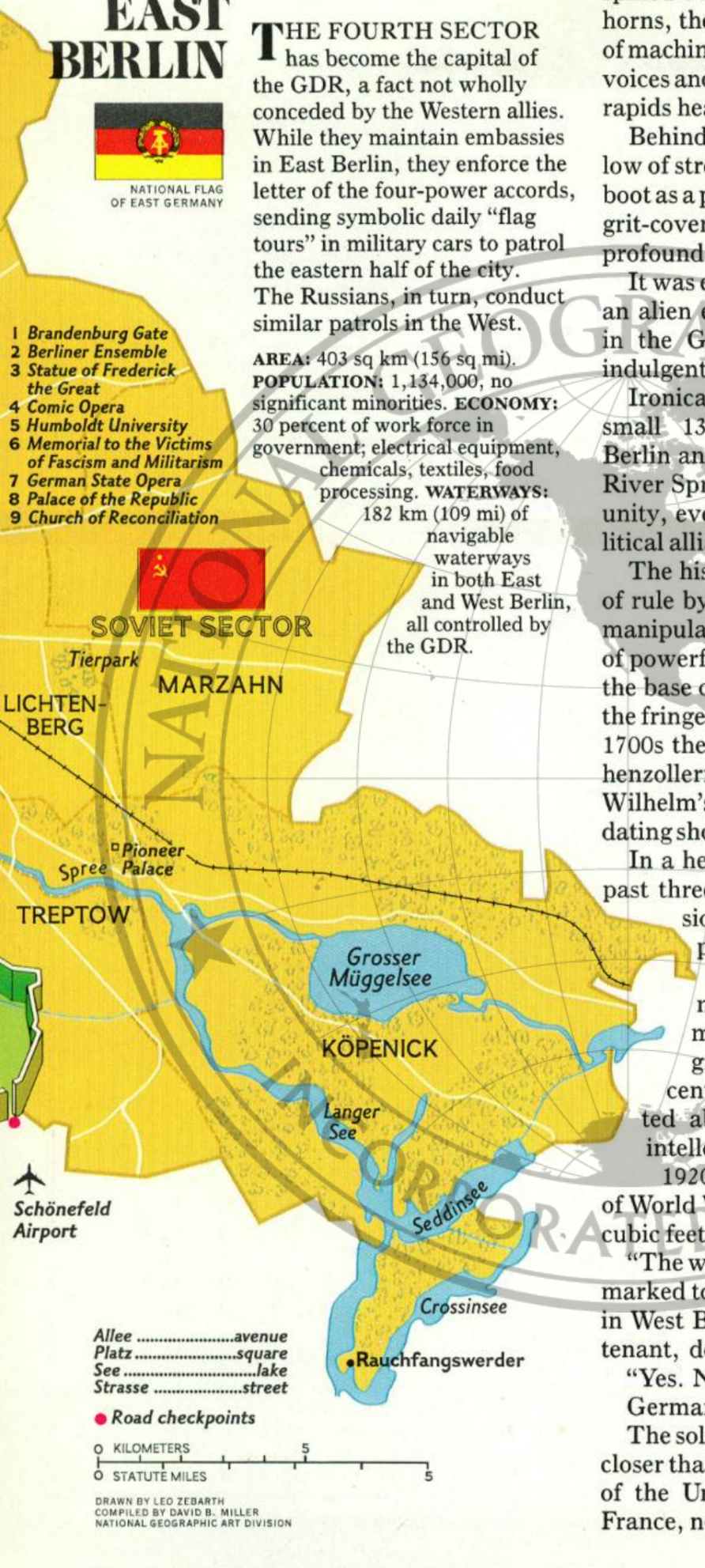
NATIONAL GEOGRAPHIC SOCIETY INCORPORATED A.D. 1888

EAST BERLIN

NATIONAL FLAG OF EAST GERMANY

THE FOURTH SECTOR has become the capital of the GDR, a fact not wholly conceded by the Western allies. While they maintain embassies in East Berlin, they enforce the letter of the four-power accords, sending symbolic daily "flag tours" in military cars to patrol the eastern half of the city. The Russians, in turn, conduct similar patrols in the West.

AREA: 403 sq km (156 sq mi). **POPULATION:** 1,134,000, no significant minorities. **ECONOMY:** 30 percent of work force in government; electrical equipment, chemicals, textiles, food processing. **WATERWAYS:** 182 km (109 mi) of navigable waterways in both East and West Berlin, all controlled by the GDR.



spilled over a wash of sound—muffled car horns, the whine of shifting gears, the whir of machines and neon lights, a muted hum of voices and trailing notes of loud music—like rapids heard beyond a still pool of water.

Behind me was only silence, the soft yellow of streetlamps, and the scrape of a jackboot as a policeman shifted his weight on the grit-covered sidewalk, guarding a city of profound and earnest propriety.

It was easy, then, to see how West Berlin, an alien enclave set a hundred miles deep in the GDR, appears to the East—self-indulgent, chaotic, corrupt, mocking.

Ironically, Berlin began divided, as two small 13th-century trading settlements, Berlin and Kölln, on opposite banks of the River Spree. Neither town was disposed to unity, even after town fathers forged a political alliance around 1300.

The history of Berlin reads like a catalog of rule by the heavy hand, a city elevated, manipulated, and destroyed by a succession of powerful men. In the 15th century it was the base of the electors of Brandenburg, on the fringe of the Holy Roman Empire; in the 1700s the capital of Prussia under the Hohenzollern kings; it was the seat of Kaiser Wilhelm's German Empire; and the intimidating showcase of the Third Reich by 1933.

In a headlong forced march through the past three centuries, Berlin suffered invasion and repression as well as dispensed it. It absorbed a rich texture of immigrants—French Huguenots, Russian aristocrats, Jewish merchants. It wallowed in the grime and exploitation of the 19th-century industrial revolution. It strutted about as the center of European intellectual and cultural life in the 1920s. And, in the *Götterdämmerung* of World War II, it collapsed into 2.6 billion cubic feet of rubble.

"The war has never ended in Berlin," I remarked to Theophil Sawadda, an executive in West Berlin, who, as a *Wehrmacht* lieutenant, defended the city in its final days.

"Yes. Neither has the shooting," he said.

Germans shooting Germans, he meant.

The solution to the Berlin "problem" is no closer than it was in 1945. The armed forces of the United States, Great Britain, and France, now called "protective" rather than

er Mauer
Achtung Bürger!
Die Kommunisten wechseln manchmal den Weg, aber nie ihr Ziel:
Die Zerschlagung unserer Demokratie!
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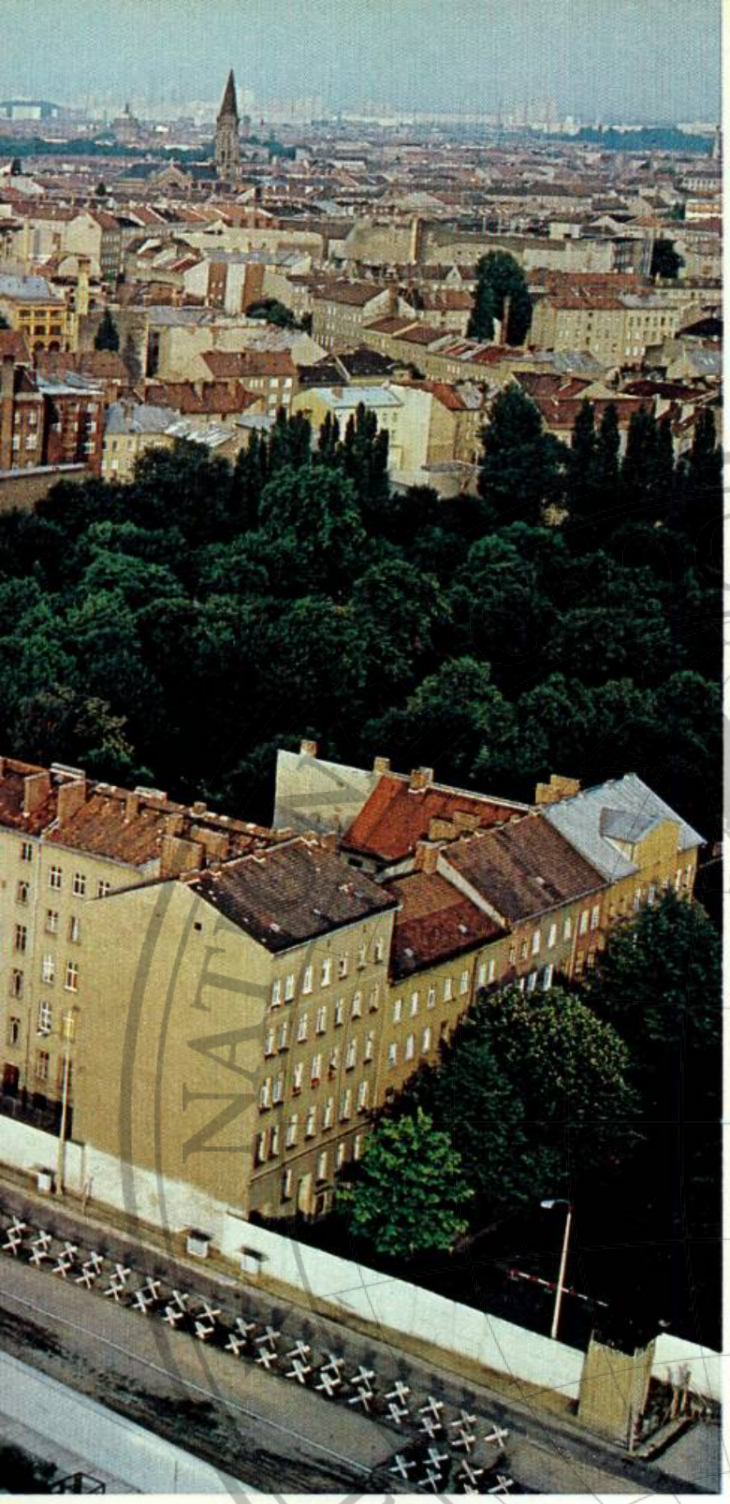


Separated from both sides, *the ironically named Church of Reconciliation sits abandoned in no-man's-land across from West Berlin's Bernauer Street* ***(above)****.*

On the 20th anniversary of the Wall ***(left)****, West Germans representing the International Association for Human Rights gather in memory of 72 persons killed at the Wall since 1961. Crosses bear the name and death date of each victim. The poster warns: "Attention citizens! The Communists sometimes change their ways, but not their goal: The destruction of our democracy."*

"occupation" powers, still maintain a presence in the city according to wartime and postwar agreements, entrenched in their respective sectors of West Berlin. The fourth, less than eager, ally, the Soviet Union, flaunts its sector as the capital of the GDR.

Between 1945 and 1961, Berlin was the hot point of the cold war born of the division of Europe. Three million people fled the East, about half of them through West Berlin, the "referendum of the feet" that choked the Marienfelde Center with as many as 2,000 refugees a day.

The brutish Wall was begun on August 13, 1961, with Berliners on both sides staring in numb disbelief at the workmen and their overseers.

In 1971 came the Quadripartite Agreement. The East agreed to guarantee Westerners unimpeded access to West Berlin across the GDR, and West Berliners 30 days a year to visit friends and relatives in the East. The West acknowledged the East German state, paving the way for both Germanys' entry into the United Nations in 1973. Since then Berlin has remained surprisingly stable in a world atmosphere crackling with belligerence.

Strangely enough, this tenuous stability now depends on the Berlin Wall. The obstacle has stemmed the human flood that threatened to empty the GDR of its ablest and brightest and has restored order to the chaos of daily confrontations. A generation has matured in East Berlin knowing nothing else. Anger has ebbed to resignation.

Tightened Security Inhibits Escapes

The walled section of the "antifascist protective barrier," as it is known in the East, is now 100 miles (166 kilometers) long, surrounding practically the entire city of West Berlin. Concrete guard towers, manned by *Grenztruppen*—border troops—loom above the border strip at firing-range intervals. Vehicle traps, fakir beds of upturned spikes, barbed wire, vicious dogs, electric fences, floodlights, and trip alarms complete the "security zone."

Escapes from East Germany to West Berlin have dried to a trickle of 12 a month. An average of fewer than ten people still test the Wall itself. Only a few succeed—a man slipping to the West in a glider, two unassuming

men with a stepladder. As life in the GDR improves, most find the risk far too great. Said one man who escaped in 1961, "If I had a choice today, I wouldn't risk my life to get out, not even risk a prison term."

Escapes can also be purchased from clandestine organizations that charge from $14,000 to $60,000 per body. The GDR itself offers political prisoners to West Germany for thousands of marks, ridding the state of dissidents and bringing much needed Western currency into its coffers.

The city's seven crossing points often function as political valves, their flow linked to the temperature of East-West relations. In October 1980, in the wake of the social upheaval in Poland, East German authorities raised the daily money-exchange requirements for Western adult visitors to East Berlin from 6.5 nonrefundable marks to 25, and also began applying the exchange toll against previously exempt pensioners

and youths. The new tax is most onerous for the old, who can afford it least. Consequently, the number of Western visitors to East Berlin has been cut in half.

Unity no longer seems plausible. The common history has been reshuffled into two separate decks, numbing memories and polarizing attitudes. On both sides, Berliners shake their heads, speak of "differing mentalities," and point their fingers at the strange new ways of old friends.

Old neighbors *rarely bother to wave any more across the carefully raked strip, guarded by a tower, between West Berlin garden houses in a rural section of the district of Spandau, foreground, and an East German collective farm. As one East Berliner told the author: "Going there, to the Federal Republic, would be like going to Poland for me. Only those who still have relatives keep the ties. When they are dead, there will be nothing."*

EAST BERLIN

In the capital city, the allegiance of the young remains the hope of the socialist future. On May Day, Young Pioneers hoist a portrait of party leader Erich Honecker.

Leninplatz
Leninplatz

TO UNDERSTAND East Berlin, I heard again and again, I had to see that the East had been the heart of the city, the Stadtmitte; the West was only the "suburbs of the bourgeoisie." And that the ferocious bombing that leveled Berlin was naturally directed onto its most important sections. And whereas the West was quickly restored with Marshall Plan money, East Berlin was further ravaged by a vengeful and suffering Soviet Union. Industries and resources were stripped; reconstruction seemed hopeless.

That was base zero—when time began for the new social order, and time simply stopped for the old. While the West turned to the United States as a role model to regain its self-respect, the East had only the Russians, who were not widely admired. So the German culture in the East—its sense of order and formality and manners, its values and prejudices, and its entire sublayer of private life—simply froze.

"If you want to feel what Berlin was like before the war," a West German friend told me, "go visit the East."

Young girls still curtsy there. Streetcars rattle and sing on boulevards of polished stone. Neon light is an infant art. Paper, not plastic, wraps the *Bratwurst*. Parents are still respected and obeyed. The *Stempel,* the bureaucrat's rubber stamp, sanctifies each of life's steps. And the streets remain full, as they were in 1939, of military uniforms.

On the other hand, East Berlin has emerged as the most prosperous city in Eastern Europe. While to Western eyes there is drabness, a monotony in the plodding respectability, and a lack of charm, Eastern visitors see East Berlin as a heartening achievement.

The city center, only ten years ago a weed-choked warren of public ruins and apologetic storefronts, now rears with high-rise apartments and grandiose government buildings—architecture of the shoe-box school, but solid. Two Swedish-built hotels, the Palasthotel and the Metropol, offer subdued but first-class accommodations. And at the site of the palace of the Hohenzollern kings sits a massive cube of marble and copper-colored glass, the Palace of the Republic, which harbors the government's legislative body and says to all those who might venture through Checkpoint Charlie, "We have arrived."

Less visible inner-city areas still molder peacefully, untouched since the war, but tourist sites like the German State Opera have been meticulously restored. And housing units are being renovated, at no cost to the occupants, at the rate of 500 flats a year in the working-class district of Prenzlauer Berg.

A Showcase for Socialism

East Berlin is a sprawling commercial center of 1.1 million people only 30 miles (48 kilometers) from the Polish border. In the north, the district of Pankow fades into garden houses, farms, and the stink of fertilizer. Here the remains of Berlin's villages, though bruised and torn, still huddle around their churches, and town cemeteries are heavy with cold marble stones of the old Prussian aristocracy.

In the east, new-town satellite projects have turned suburbs like Marzahn and the junction of Leninallee and Ho-Chi-Minh-Strasse into sweeping construction sites, homes for more than 100,000 people. The landscape teems with children and playgrounds, saplings guyed by wires, new grass—the master-planning boards sprouting to life. The city-wide goal is 300,000 new and renovated flats by 1990, enough to eliminate the housing shortage.

In the south, in Köpenick, a district damaged little by the war, there is a whimsical brick and stained-glass town hall, a Hohenzollern castle on a river island, and 17th-century houses sagging comfortably against each other over cobblestone streets.

Thirteen lakes and 55 miles of waterways moisten and refresh the valley of the Spree River, and 30 square miles of wooded

All roads lead to Lenin Square *near the central city, where scores of modern apartment blocks help house East Berlin's growing population. Living standards are on the rise as well, and security compensates for the drabness of state-organized life. One generation has already matured in the isolated new society.*

The official face *of the city is the central showpiece of trade and tourism called Alexanderplatz, a plaza ringed with offices, hotels, and well-stocked department*

stores. To its Communist neighbors, East Berlin has become a Paris, offering a taste of cosmopolitan flair and a comparatively wide variety of consumer goods.

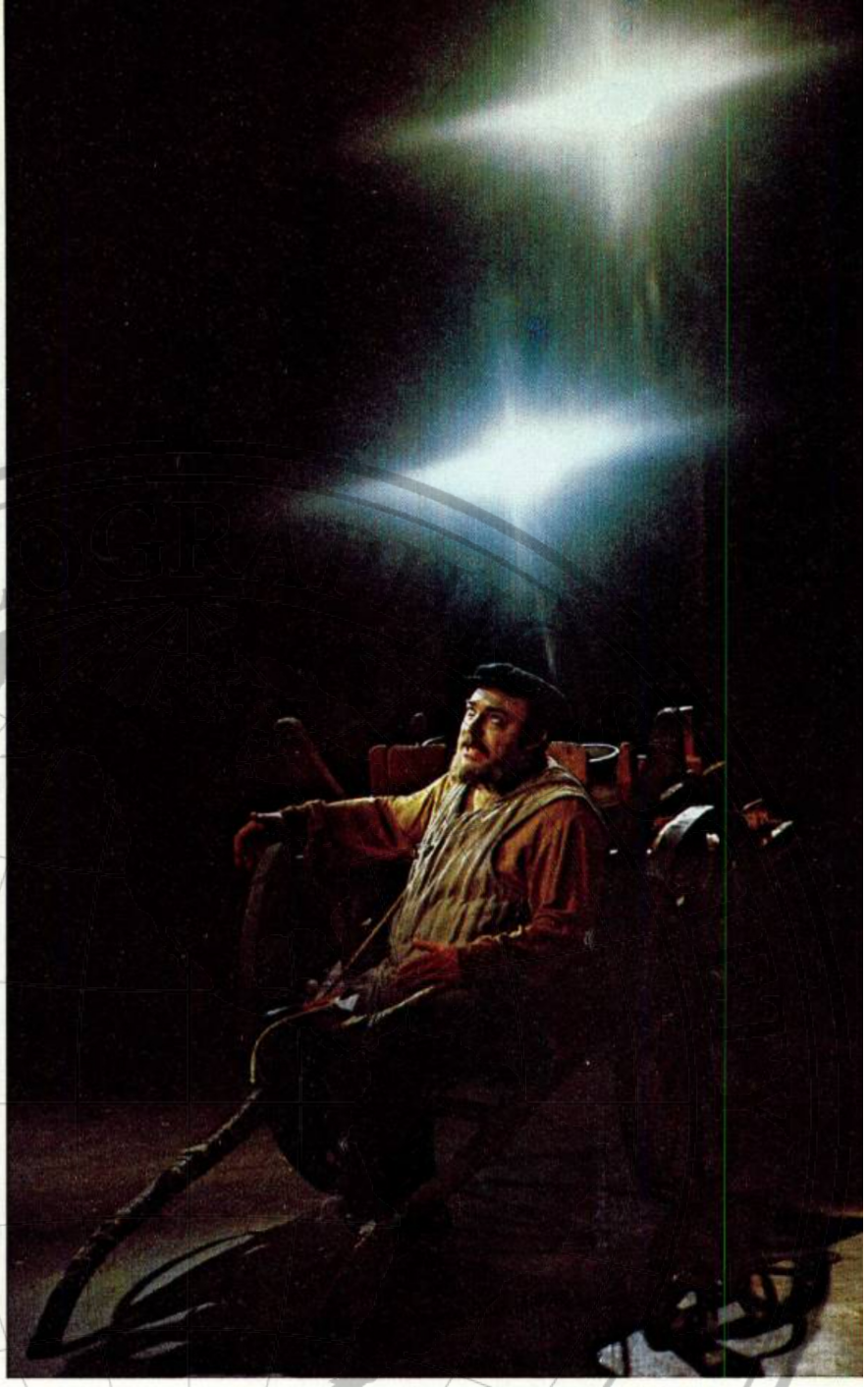
lands and 10 campsites offer pine-scented respite from the clamor of industrialization.

Although the state heatedly seeks to separate itself from the Nazi past, Prussian military tradition has not lost a stride in East Berlin. It honors the Memorial to the Victims of Fascism and Militarism with steel-helmeted bandsmen tra-ra-ing Prussian marches, while goose-stepping guards in heavy black boots slam about the front of the memorial with rifles.

Yet only in the past few years have the Prussian roots been acknowledged by a cautious but increasingly confident state. And the word "German" is just now losing its bitter taste. Select figures such as Martin Luther have been elevated to the socialist pantheon. And, most symbolically, the equestrian statue of Frederick the Great, banished to Potsdam for 30 years, has been remounted on its pedestal on Unter den Linden. All day people come and just stare at the reborn "Comrade Fritz" with affection.

From the Prussian past, too, East Berliners have inherited a stoic sense of duty and industriousness. In their 20 years of isolation they have goaded the East German economy to the highest level of all the Soviet bloc countries, a position that seemed only reasonable to some East Berliners. Said one: "Of course I have it better than the Bulgarians. I'm a German."

At the 7th October machine-tool factory in the district of Marzahn, I asked a foreman



named Brückner how he felt about the recent labor unrest in Poland.

"Frankly," he said, "we don't understand what the Poles want to do with their strikes. As a worker you have to work. But then, in Poland there is a regress in living standards, and here there is progress."

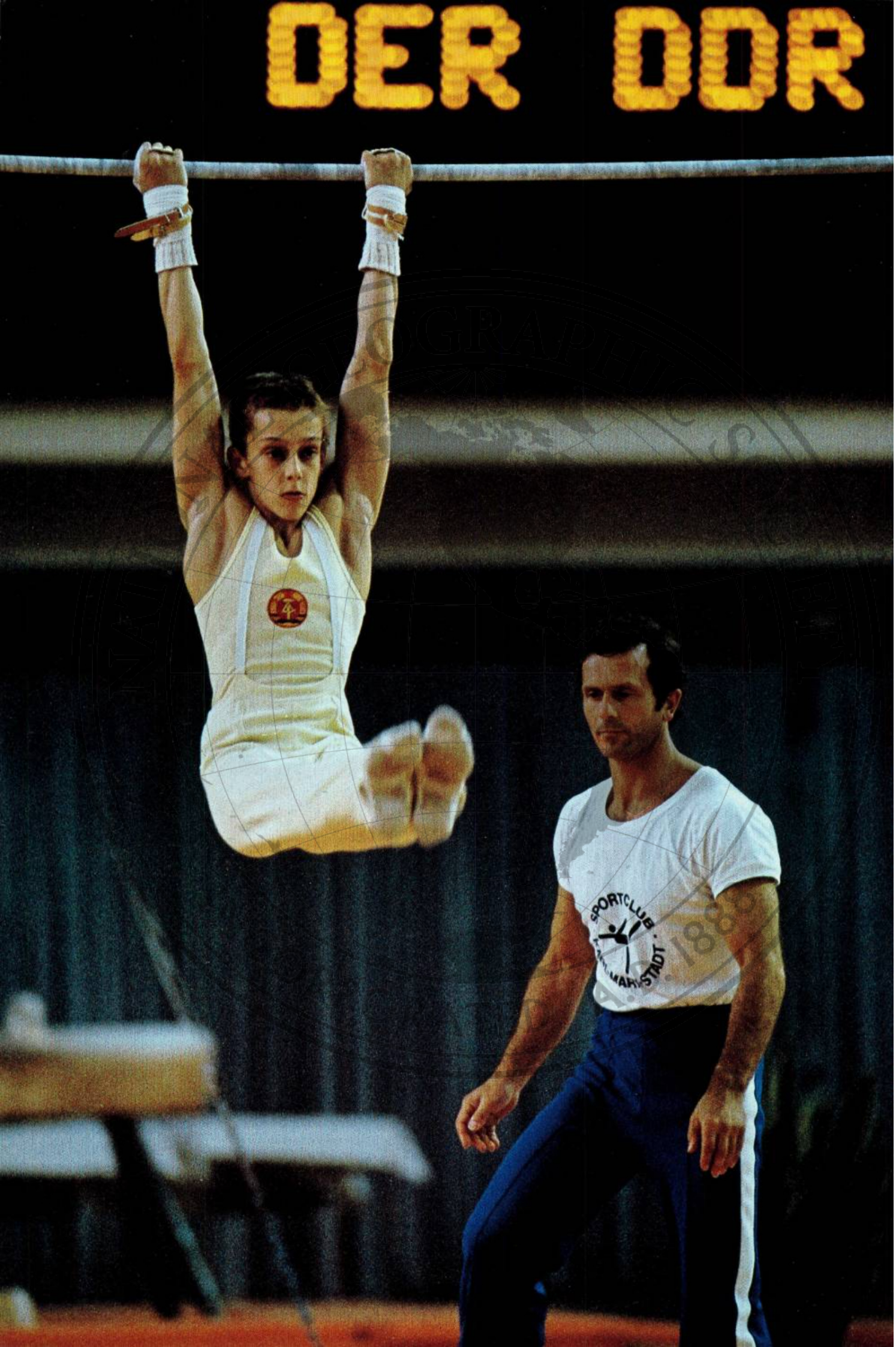
A party man gave me the most chilling look at the East German attitude toward political dissent. "Dubček," he said, referring to the leader whose liberalizing "Prague Spring" brought the 1968 Soviet invasion of Czechoslovakia, "was to us as the Ayatollah Khomeini is to you."

Materially, East Berliners live better than they did in 1939, but continually, almost perversely, they compare themselves with

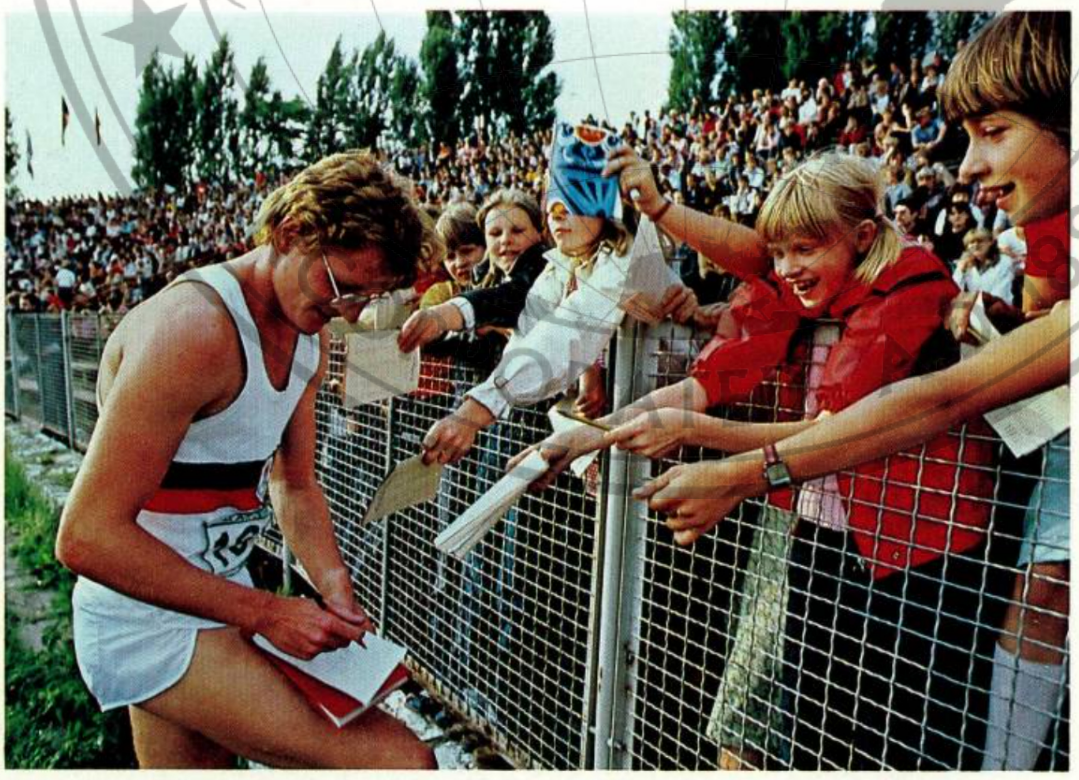
***A resurgence of tradition** has begun to soften the rigid tenets of Marxism, and the Lutheran faith has become a significant new force among young people like Bernard and Ines Birk (**above left**), with their son Johannes in their one-room flat.*

*Tradition also concerns Wolfgang Dehler in his role as Tevye the Milkman in the Comic Opera's production of Fiddler on the Roof (**above**), the American musical about the oppression of Jews in tsarist Russia.*

As the prewar cultural center of the city, East Berlin still attracts many West Berliners to the State Opera House and Bertolt Brecht's Berliner Ensemble.


DER DDR
SPORTCLUB

Made in the GDR: *Europe's best tuned athletes are vigorously developed here, with promising children segregated into demanding special sports schools. During the 1980 Youth Games, one student performs on the high bar* ***(left)****; another strokes past the scorers' table at the vast Sportforum Berlin complex in the district of Weissensee* ***(above)****. For the successful, like Olympic sprinter Andreas Knebel* ***(below)****, there is international travel, prestige, and adulation.*



the more affluent West Berliners. The Wall remains an embarrassing, unspoken admission that something is fundamentally wrong in the society, and there remains the difficult task of explaining to the new generation exactly why it is there.

The answers are couched in terms of the future, for the GDR is an immense human experiment. It operates here under laboratory conditions, with a captive population. If anyone can make Communism work, most Western analysts agree, it will be the GDR.

Sacrifice and solidarity demand a common enemy, so the guilt of German fascism, purged from the East German past, has been transferred to West Germany, where it has been augmented by what Eastern ideologues consider its natural extensions—capitalism and Western "imperialism." Although Christianity has made a strong comeback, the struggle against these isms of the West, and for "Peace," defines the moral base of what has become a secular state religion. "Heaven" is a Communist future. "The Good" is what comes from hard work. "Evil" is tangible as well, and comes every day on three Western channels.

Against West Berlin radio and television, standard fare for East Berliners, the ideological battle sometimes seems like a treadmill for Dr. Klaus-Peter Kosanke, director of a youth activities center.

"I can spend an entire hour on our TV trying to explain the value of human life, and how people need peace," said Dr. Kosanke, "and then a young person can simply switch the channel and watch something like *The Green Berets* or some violent Western. It destroys all the values we try to teach."

For the Children, Anything

While sidewalks may crumble and housewives may queue for vegetables, nothing is spared on the development of the young. In the district of Köpenick, a million and a half children a year glory in a colossal Pioneer Palace, a complex of sports and hobby facilities—Olympic-size swimming pool, gymnasium, ballet studio, rooms for chemistry, pottery, puppetry, model-airplane building, folk singing. One room simulates spaceflight (page 28), with videotaped scenes of earth during blast-off. All are free.

By the time they reach age 14, East Berlin children also know what is expected of them, and the ceremony called *Jugendweihe,* symbolizing the beginning of adulthood, leaves no doubts.

For the Jugendweihe of School No. 39 in Berlin's Lichtenberg district, a full professional symphony orchestra in black tie had been summoned to play Handel and Mozart, and retired Adm. Waldemar Verner was assigned to make a speech.

"It is a true privilege," he said, "for you to be living in the GDR, because you have hope for solidarity, equality, and freedom of the individual. We should not forget the terror of capitalism. . . . It brings inflation, degeneracy, no hope for peace, and constant aggression against the socialist countries. . . . There is nothing as glorious as fighting against the bad demon of imperialism."

Later, as the gathering dispersed for picture taking, there was talk of a hefty new ism in GDR life—materialism.

"We were more idealistic," one parent lamented. "Now the important things seem to be the presents the young ones get—radios, cassette recorders, even motorcycles. There is a lot of status seeking."

Integral to the master social plan is East Berlin's Humboldt University. Once, as the University of Berlin, it was the center for an academic elite that included physicists Max Planck and Albert Einstein, as well as philosopher Karl Marx. Today it serves in part as the social research division of the state, far removed from the ivory tower.

"At present, labor psychology may be the most important work we do," said Professor Dr. Dieter Klein, the university's vice president for social sciences. "You see, productivity is much higher in West Germany than in the GDR, and this puts a lot of pressure on our people. It makes things very difficult spiritually. People in a capitalistic society have an automatic drive to produce. But here, there is no unemployment, so there is no competition.

"Formerly," Dr. Klein continued, "we Communists thought it would take a shorter time to convince people. If they see that we are building a peaceful society, and that we care for social progress, we thought, they will work as hard as possible. We see now that this is not self-evident."

For those of college age, socialist fervor is

whipped up annually at the International Festival of Political Song—patterned, said Dr. Kosanke, after the American hootenanny. In the corridors of Seelenbinder Hall, long-haired musicians, Cuban exchange students, and Angolans with Palestinian kerchiefs milled about the display stands buying beer, sausages, pinwheels, and buttons espousing Salvadoran guerrillas. A corps of Irish bagpipers wailed work songs in the vestibule, and *Volkspolizei* corporals danced a jig in the balcony.

From an East German student, whose political button spoke for American Indians ("The Black Hills are not for sale"), I learned: "All workers are oppressed in America. If workers could vote, they would vote Communist. It's just that they haven't heard of the Marxist-Leninist theory yet."

Little Sparkle in Workaday World

Realities dampen such enthusiasm as the working life begins in earnest. For the average East Berliner, things are essentially dull. More than 80,000 (West Berliners say far more) still live in run-down pockmarked apartments with community toilets and coal-burning stoves.

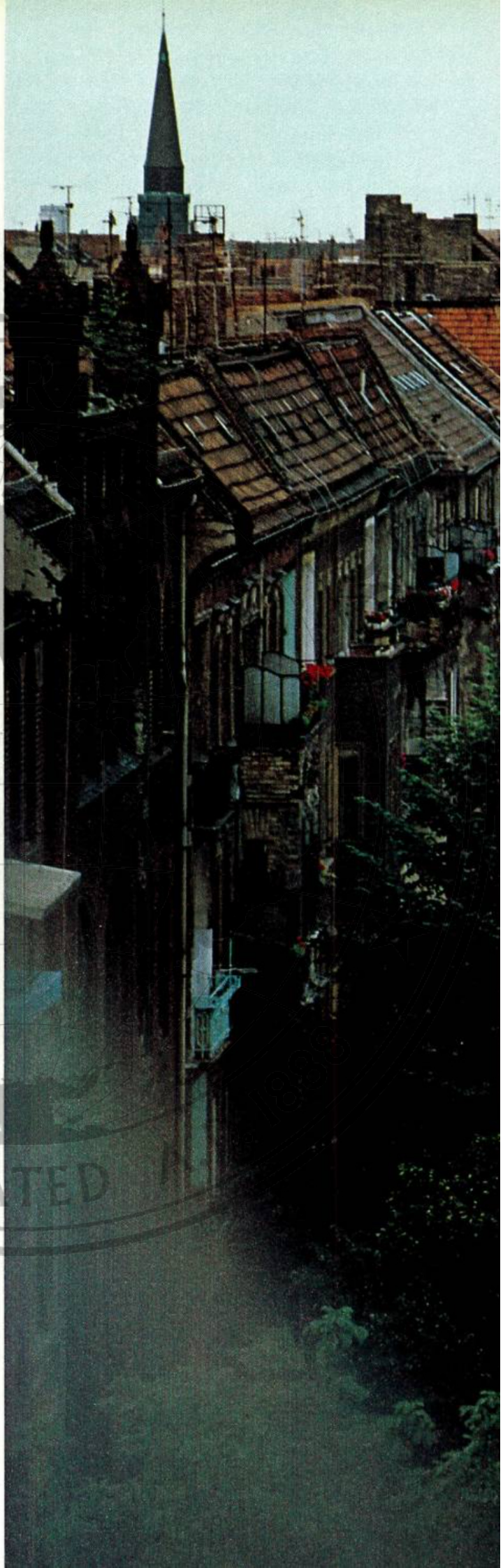
The future looks preordained and pedestrian. Thirty-six years of Communism has created a city of villagers, people drained of much of their urban drive and joie de vivre. The man on the street seems weary and accepting, the Communist Party member belligerent with dedication. Spontaneity and individual initiative are generally mistrusted; the boat is left unrocked.

Yet the average income is relatively good, about $400 a month. Rent may be $50, a bus ride seven cents. Couples receive credits of $2,000 from the state to start households, and pay back decreasing amounts as children are born.

"We have a high standard of living," one irreverent young man told me, "because Berlin is so close to the border. We're kind of a shopping window for the socialist bloc."

But the most serious shopping is done in a state-run subeconomy of Intershops, where anyone with Western currency can buy products—canned goods, detergents, TV sets, blue jeans—from the West. Controversy rages over the Intershops. Those with relatives in West Berlin are kept in steady

A sleek generation *judges the latest rainwear during a fashion show at the Swedish-built tourist Palasthotel. Says GDR Fashion Institute spokesman Wolfgang Fröbel: "There is a new attitude toward fashion. Ten or 15 years ago even jeans were considered decadent; those times are long over. Now we have to do more market research to find out what people want."*

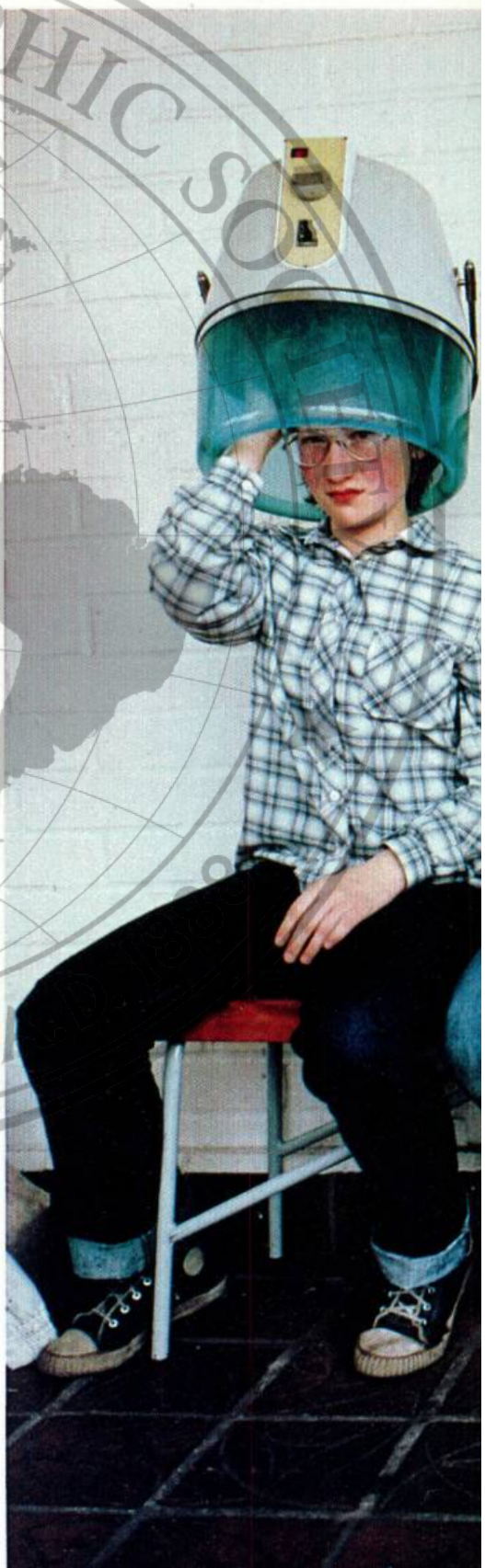


***In nostalgic contrast** to the modern city center, the working-class district of Prenzlauer Berg remains much as it was just after World War II, only older and shabbier (**right**). Many of the apartment houses remain nicked and scarred by the bombing (**above**). In 1945 more than half of all East Berlin flats were destroyed, and a billion cubic feet of rubble clogged the streets. Much has been restored, but the city still struggles with housing and pools its energies toward a 1990 goal of 300,000 new and renovated flats.*

supply of West German marks, while others must make do.

The unconnected must wait for years for the $5,000 fiberglass two-cylinder Trabant, the GDR's economy car that makes East Berlin sound like a lawn-mower rally. The more elegant Wartburg, with an average cost of about $8,500, takes even longer for delivery. A color-television set costs between $1,000 and $2,000. Telephones are owned by less than half of East Berlin residents; they are allotted on the basis, as one young man put it without a trace of sarcasm, "of how often *they* want to call *you*."

They—the self-righteous bureaucrat, the ever present policeman, the shadowy informer—are still a wearisome part of life in East Berlin. It remains a society of command and obedience. Young men are drafted not only into the military but also into the



The royalty of the East *is its children. At the Pioneer Palace, a complex of sports and hobby facilities in Köpenick, 1.5 million a year enjoy such special attractions as the Cosmonaut Room, where they can spin on an apparatus that simulates space travel (**above**). After a swim in the Palace pool (**right**), bubble-gum princesses dry their hair.*

civil police force, the *Bereitschaftspolizei,* which seems to specialize in street-corner scowling and intimidation by sheer numbers. The Stasis, short for *Staatssicherheitsdienst* (State Security Service), is not the Gestapo, but is disagreeably ubiquitous.

Each citizen carries an identity pamphlet that summarizes his public life: conditions of birth and employment, periods of unemployment and the reasons why, addresses, a list of dependents. The pamphlet is surrendered to any official who demands it. There is *Ordnung,* order, in the land, but the spirit suffers, and cynicism spreads with the continuing contradictions between socialist theory and practice.

"You learn at an early age that in many instances absolutely nobody believes what the government is saying," a former GDR citizen told me in West Berlin. "At political

meetings a party member will talk. *He'll* know that what he's saying is nonsense. And he'll know that *you* know it's nonsense."

In defense, people retreat into family life and hobbies. Neighborhoods turn themselves off from the world, and streets are empty at night. Society's shortcomings are rationalized away in the name of security, and the inaccessible outside world is cast in black and white.

"What right did you Americans have to destroy Vietnam?" one man blurted as I sat with him at a café in Köpenick.

I asked him about the Wall.

"That's another story," he answered. "Every man needs his freedom to go where he wants. But here there are no decisions to be made. I have my job; I cannot be fired. There are problems, but not like in the West with inflation and drugs and crime."

He asked me what Americans thought of the GDR, and I told him.

"That's the trouble," he said. "We have a very clear picture of the West, but you seem to have the wrong picture of us."

Western visitors can only mean problems for most East Berlin families. My West German translator and I accepted an invitation for dinner from an enthusiastic and beaming young woman who promised to make a pizza. But things were a bit awkward when we arrived at her fourth-floor apartment in Prenzlauer Berg. She had not checked first with her husband.

"This sort of thing is not done," he told us curtly, and asked us to move our West German Ford, which we had parked in front of the apartment building, to a location down the block. After several hours of nervous small talk, no pizza materialized, and we finally left. A law forbids GDR citizens, we learned later, from making contact with Western journalists without special permission from the state.

"You have a small circle of friends that you trust," another former East Berliner told me, "but you wouldn't even tell your very best friends the truth about what you think. I have led two lives all my life."

Weekends Are for Playing

Most East Berliners spend their weekends in the pursuit of leisure—the serious, methodical pursuit, it need hardly be added, of people who are just now learning how to relax again. The parks and numerous sports facilities, feeding the GDR's passion and best known international success, are filled with earnest legions of runners, swimmers, and bicyclists.

At the Tierpark (animal park) on the grounds of an old Prussian manor house, assistant director Dr. Hans-Günter Petzold showed me through the expansive gardens

With few raw materials *but brown coal and the German mind, the GDR has become the world's tenth most productive industrial nation. Products vary from model trains at VEB Berliner TT-Bahnen* ***(left)*** *to ships at VEB Yachtwerft Berlin* ***(right)****, where welders take a break from the construction of a small barge for the city's 55 miles of commercial waterways. Within the Eastern bloc, only the GDR's five-year plan has projected economic growth—5.5 percent in a time of general recession.*

that draw as many as 60,000 summer visitors a day. "Practically every zoo in Europe," he said proudly, "has Vietnamese potbellied pigs from our park. They're very active. We sent two to London but 12 arrived . . . it was bad business for us."

Other problems arise as well. "I find myself," Dr. Petzold said, "in the ludicrous position of lobbying the government for a new elephant house in a socialist country where there are not enough flats for people."

South of Köpenick, I spent three lazy days on the banks of the Crossinsee, pup-tented among tall pines and shiny East German mobile-home campers. In the evening each family erected a little canvas fence around its campsite, and portable television sets flickered with soccer games.

Here, borders and politics seemed distant, the life affluent. Rauchfangswerder, deep in the Köpenick forest, was a surprisingly American-looking suburb of neatly painted modern homes and quiet streets, sprinklers and flower gardens, and children floating in inner tubes under the willows.

At the restaurant called Rübezahl, beside the Grosser Müggelsee, hundreds of East Berliners savored coffee at outdoor tables. A wedding party lined up for the obligatory informal portrait, and, suddenly, from the loudspeakers boomed the voice of Elvis Presley: "It's now or ne-vuh. . . ."

Western pop unavoidably leaks into East Berlin, but traditional culture is still the city's pride. West Berliners, some in tuxedos or allied military uniforms, filter nightly through Checkpoint Charlie, perhaps heading for a performance of *The Magic Flute* at the State Opera, or *Fiddler on the Roof* at the Comic Opera, or a Bertolt Brecht drama at the Berliner Ensemble.

Joachim Tenschert, stage manager of the Berliner Ensemble, spoke with me over cognac and sandwiches. An intense man with imploring eyes, he has directed theater from Sweden to Australia.

"But the Berlin audiences," he said. "Ah!" And he tossed an airy kiss. "Sometimes they are better than the play."

Age Brings a Chance to Relax

One night I mingled with the audience in the lobby of the Distel cabaret, where satirists dissect most of socialism's sacred cows. And I met an old Berliner with the wisely impudent charm of a retired elf.

"Ah, you write of geography," he said, sizing me up. "As long as you don't write about love. Love, you see, is an omnibus that is always late. And when it finally arrives, you are otherwise occupied."

The gap between the old and the young is cultural as well as generational. For those who have retired, who have ceased to be

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The painful past *remains with Berlin's old. In the Jewish cemetery in Prenzlauer Berg* ***(below)****, Christophe Frankenberg waters flowers on the grave of his daughter, Vera, killed by a grenade during the final days of World War II.*

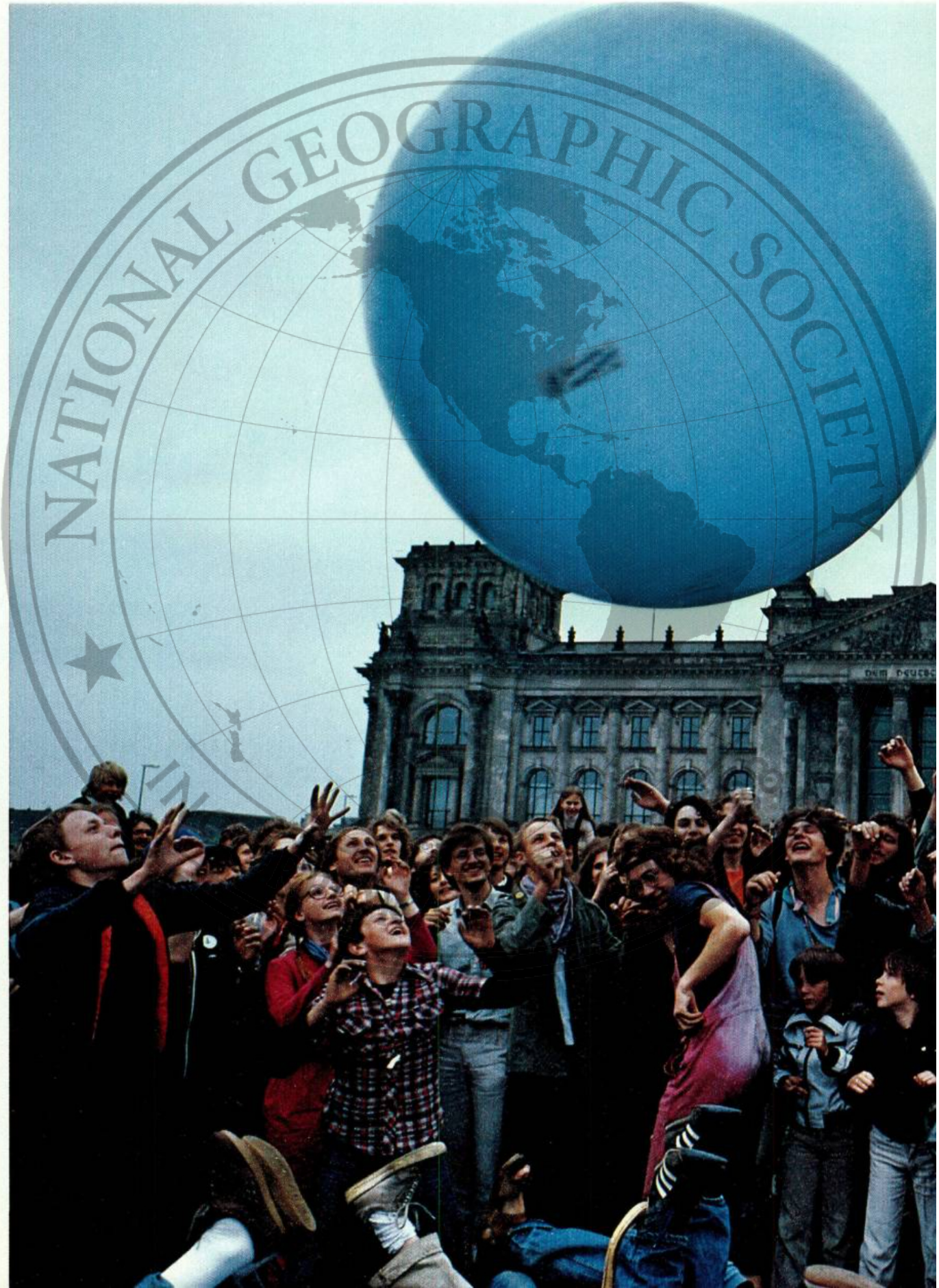
At a summer cottage in Weissensee ***(right)*** *Albert Risch grows and sells flowers; paintings by his wife, Hildegard, decorate their wall. GDR pensioners qualify for 30 days' annual travel to the West. Only then does the Wall become a simple border, and Berliners are true Berliners once again.*

units of production, the lectures are over, and their memories are free to roam. Even the Wall opens up. Women over 60 and men over 65 qualify for yearly 30-day visas to West Berlin. Some stay, but most are content just to visit. Pensions provide for their basic needs. Except for a few: One 71-year-old woman at the Friedrichstrasse railway station, for example, had just smuggled a West Berlin television-program guide past the border guards, rolled up in her underwear. "Nobody looks there," she said with smug satisfaction.

Parade Symbolizes Order

The working class had its day on May 1, when practically the entire city massed orderly past a stand of dignitaries on the broad Karl-Marx-Allee, bearing flowers and giant posters of Communist heroes. Groups of athletes—cyclists on their bikes, fencers, rowers, and gymnasts—streamed by, all

WEST BERLIN



Merrymakers toss a giant balloon on the lawn of the Reichstag, once parliament of a united Germany, today a poignant symbol of the past in a vibrant, unsettling Western enclave.

BY THE HAVEL RIVER where the border runs midstream, an old man tended a long fishing pole in the shade of West Berlin's Grunewald Forest.

"Catching East or West fish today?" I asked him, hoping to test the traditional wit of the true Berliner.

"Mixed."

"How do you tell which is which?"

"The East ones wear party buttons."

"Aha. Are you a Berliner?"

"No."

"How long have you lived in Berlin?"

"Sixty-five years."

"Do you think," I asked, scrambling to stay on top of the conversation, "the Russians will ever invade Berlin?"

"No, it's not important enough. They would go straight to France. The United States and the Soviet Union are dividing the world up between themselves. Well . . . this time I won't have to fight."

All has been quiet on the front. The 12,000 troops of the Western allies seem almost symbolic, like the Swiss Guards at the Vatican, for the city of West Berlin is encircled by half a million soldiers of the Warsaw Pact—350,000 Russians and 150,000 East Germans.

West Berlin: A Special Case

West Berlin is not a constituent part of the Federal Republic of Germany; technically it is governed by the Western allies. But it has become a welfare case kept solvent by transfusions of West German funds that pay more than half its budget, including 400 million dollars a year for allied protection.

For the first time, some Berliners are seriously reevaluating the continued need to be protected. Optimists calculate the GDR bleeds the West for so much in access taxes and other revenues that it prefers to keep the status quo. Besides, they say, if the lights go out in West Berlin, they go out in London too. In last summer's mayoral election, a left-leaning coalition called the Alternative List gained more than 7 percent of the vote on a platform that included drastic reduction of allied troops.

Governing Mayor Richard von Weizsäcker, whose Christian Democratic Party ended 35 years of Social Democratic Party dominance in West Berlin, thinks the troops are a sensible deterrent to any invasion. "There was an assumption after the 1971 agreements that Berlin as a political problem had disappeared," he told me. "This is certainly not true. Berlin is geographically and politically in the middle of the main fact of Europe—the division of Europe. If you take us out of international politics, then we are nothing but a problem—a bundle of two million people to be supported somehow."

Still, there is a feeling that the era of confrontation is over. A mood of anticlimax hangs over the streets. Leaders search for adrenaline. The East looks on, confidently expecting a steady erosion of will.

"Germany is without a capital, like a giant without a head," actress-author Hildegard Knef told me in her Grunewald home, "but Berlin is still its least provincial city."

It remains a vibrant, brawling, and vigorous metropolis of splinter groups, subcultures, and artistic ferment, energized by the push and pull of tension and release.

"Berlin is like a hot frying pan," artist and sculptor Emanuel Scharfenberg said. "Put something in and it burns right away."

And yet, there is an unruffled, business-as-usual core to the city, and a widespread and wistful urge for a normal life. Many children have grown up with only a vague notion of their abnormal circumstances, and the Wall does not surround every life.

West Berlin is still the biggest city in Germany, both in size and population, and the largest industrial center between Paris and Moscow. Its gross production is half that of the entire nation of Denmark. Some of its problems are those of many Western cities—loss of population, inadequate housing, unemployment caused by automation of industries. But in West Berlin these are compounded by the political uncertainties and cumbersome logistics of isolation. Corporate headquarters have left for Hamburg, Munich, or Stuttgart.

Twenty percent of all Berliners are over 65, compared to 15 percent in West Germany. Another 22 percent are under 21—many of them students, adventurers, drifters, taking advantage of the draft-exempt status of Berlin residents. *Gastarbeiter,* guest workers, form another 9 percent. In the middle is a worrisome dearth of mid-life married couples with children, backbone

of a city's work force, and also its future.

The city's labor department campaigns in West German cities for settlers and offers a broad package of monetary incentives for skilled laborers. Little has worked. Said administrator Gerhard Voigt wryly, "We are considering a power-out, like the one you had in New York City. Nine months later there was a great increase in population."

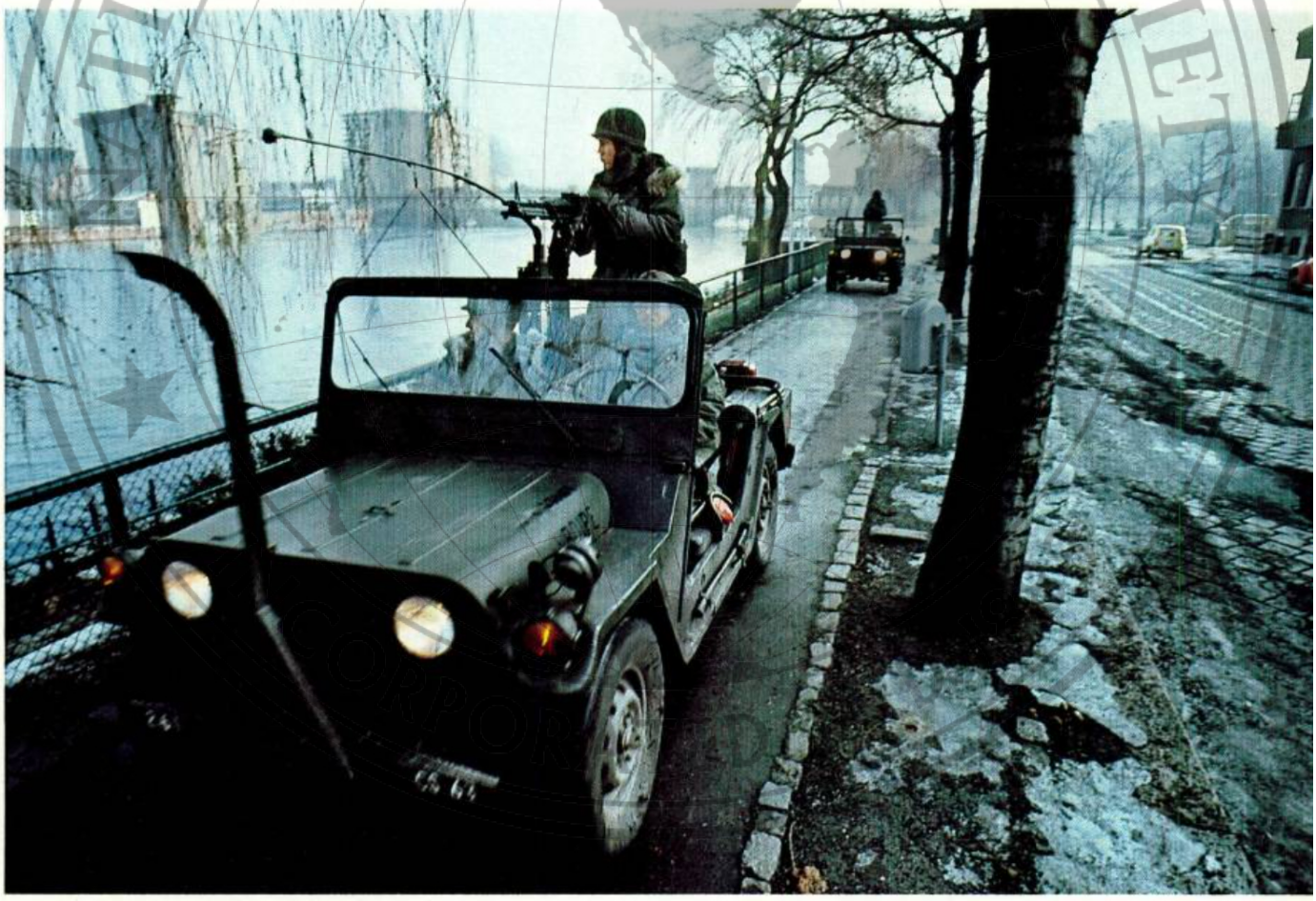
Says Robert Layton, who as head of the Berlin Economic Development Corporation grapples with attracting industry to West Berlin, "This city is better than its reputation. In three years we have brought in 85 companies and 300 million dollars' worth of investment. The investment rate is higher than in West Germany as a whole.

"But we have to try to develop a new image, to show how free enterprise will work. We have to stand up to comparison. Not with East Berlin, of course. Nobody bothers to make a comparison with the East. We have to be better than Madrid, Milan, London. We could become a symbol, the best city in West Germany."

Woodlands Ease Urban Pressures

From the air West Berlin looks like a piece of jigsaw puzzle, bounded by the bare-earth, 50-yard-wide GDR "death strip." The city has no hinterlands to support and nourish it. But within its limits are 50 square miles of lakes, parks, and woodlands with deer and wild boar, the largest green area of any city in the world and a precious outlet for the tensions of isolation.

Space is methodically allotted. At Grunewald Lake, one beach is for families with children, another for nude bathers, a third exclusively for the city's 100,000 dogs.



Showing allied muscle *where the Wall lies across the River Spree, machine-gun-bearing U. S. Army jeeps patrol the edge of Kreuzberg. Should West Berlin be attacked, "there would be an active defense," said Maj. Gen. Calvert P. Benedict, then commandant of U. S. Berlin forces. "The Soviets would have to make the first act of shooting . . . and they would have to shoot a lot."*

In the northern village of Lübars, the farmers grow wheat and barley. In Spandau in the west, where Nazi war criminal Rudolf Hess lives out a lonely sentence, residents still speak of "going to Berlin." In the southwest, the hamlet of Steinstücken reaches into the GDR like a cherry connected by a stem of wall-lined road—another box in a city of boxes in boxes.

My room in the Hotel Continental seemed out of Christopher Isherwood's *Berlin Stories* of the 1930s. In an anteroom with potted ferns and the soft light of frosted glass, I would sit and listen to birds singing in the *Hinterhof,* the quiet courtyard between the cool stone buildings.

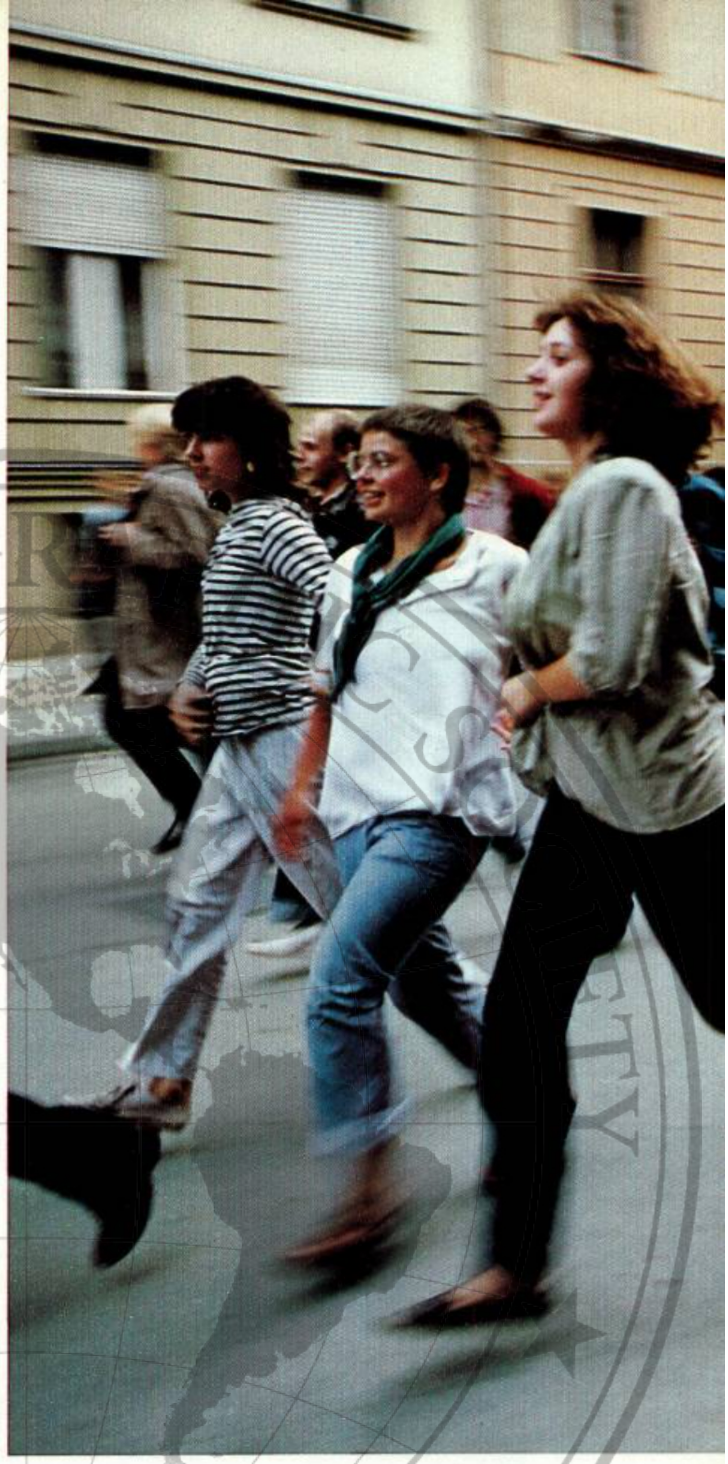
The maid was a buxom Italian named Victoria, the night deskman an entertainingly wild-eyed socialist. The assistant manager, Artur Vogt, hobnobbed with the city's past, and liked to say things like: "I knew Marlene Dietrich when she served cognac." And best of all, the hotel sat right on the Kurfürstendamm, Ku'damm for short, West Berlin's bazaar of affluence and excess.

But it's not what it used to be, said Artur. "It's all going downhill. The good shops are moving out, and what's coming in their place? Peep shows and hamburger stands. They kill the city."

The street life of the new West Berlin swirls around the ruins of Kaiser Wilhelm Church, left as a memorial to the war. On the corner of Joachimstalerstrasse, buildings are stacked like marzipan cakes frosted with neon, and billboards hawk suntan lotion and blue movies. In the Café Kranzler, the grande dames of Berlin, with their helmetlike felt hats, sip *Berliner Weisse mit Schuss,* white beer injected with raspberry syrup. Many elegant shops remain, gleaming with porcelain and leather goods. In the opulent KaDeWe department store, shoppers are faced with whole wild boars, fresh lion meat, and 1,400 kinds of sausage.

Demonstrations are almost routine in a city politically obligated to tolerate free expression. Special-interest groups pop up and down like hand puppets to shout out their causes—anarchists hooting at capitalism, left-wing Turks battling "imperialism," right-wing Turks battling left-wing Turks, environmentalists protesting dirty air.

"Berlin demands very much from you,"



The brotherhood of protest *sweeps full scale across a city morally obligated to tolerance, as young West Germans flock to West Berlin for its keen edge of excitement as well as for the draft exemption accorded residents. Demonstrations against the housing shortage ignite the streets* ***(above)****, and squatters occupy more than a hundred vacant houses. As in the Kreuzberg home of this young squatter* ***(right)****, some landlords have retaliated by destroying plumbing and heating fixtures. Recent demonstrations have been more political—protesting U. S. nuclear missiles in Europe.*

said artist and cultural gadfly Ben Wargin, who plants ginkgo trees throughout the city and calls it "action art." "You can't overlook all the problems here. You just can't close your eyes and refuse to see.

"Of course," and his eyes spat sparks of cunning, "you could join the civil service."

On the Ku'damm and in its 200 cafés, restaurants, and *Kneipen* (pubs) wander the rich and the destitute, the low and the high. American GIs in cowboy hats, Lolitas in aluminum jump suits, punkers with green hair, sidewalk-wide bevies of Bavarian tourists, Hare Krishna disciples leaping about in saffron robes, and roller skaters acrobatically weaving in and out of it all.

"Berlin is very relaxed," says Romy Haag, whose transvestite nightclub comes close to the popular image of *Cabaret*. "It's anti-chic. You can dress any way you want, do just about anything you want. Berlin has a history of decadence. And," she said throatily, "I lo-o-o-ove decadence."

West Berlin is faced with two more immediate problems, the Turkish guest workers and an influx of young people from West Germany searching for good times.

In 1961 the Wall closed off 60,000 East Berlin workers from their jobs in the West, and the city went recruiting. Italians,

Yugoslavs, and Turks poured into West Berlin, and today compose a fifth of the work force. While other nationalities were quickly assimilated, the Islamic Turks isolated themselves from what they considered a permissive society. The district of Kreuzberg, charming but seedy, became a virtual Turkish ghetto. Paradoxically, most Turks want to stay in West Berlin.

Once here, the Turkish worker takes advantage of West Berlin's system of *Kindergeld,* child money paid for each child. Extended families crowd into small flats. Sanitation suffers. And schools must cope with children who speak very little German.

With high rises like hillocks *on the Prussian plain, the satellite town of Märkisches Viertel blends 60,000 flat dwellers into the quiet streets of Reinickendorf. A factory complex sprawls on the left. The urban environment fades quickly into the farmsteads of rural Lübars and north to the border.*

Despite the fabled "Berliner Luft"—the valley's bracing air—fewer and fewer middle-class West Germans are content to build their future in a climate of uncertainty, and many move elsewhere.

Said Angela Esch, a young Schöneberg teacher: "The Turkish children don't feel like Germans and they don't feel like Turks. They're very industrious, but they have bad problems learning. I'm taking Turkish language lessons on my own time and money.

"It can be difficult for girls. Some Turkish parents don't want them to take part in sports, especially swimming—because they would have to wear bathing suits."

"Housing is the main problem," said Turkish schoolteacher Kazim Ismailcebi. "Turks have many children and they are very loud. They make music."

Not only Turks are caught in West Berlin's acute low-income housing shortage. Of some 1.1 million flats, 90,000 are substandard. Developers find it more economical to build new flats than to renovate, since rent-control laws keep rents down on restored houses but not on the new. But now, rising construction costs have forced many to abandon old buildings altogether.

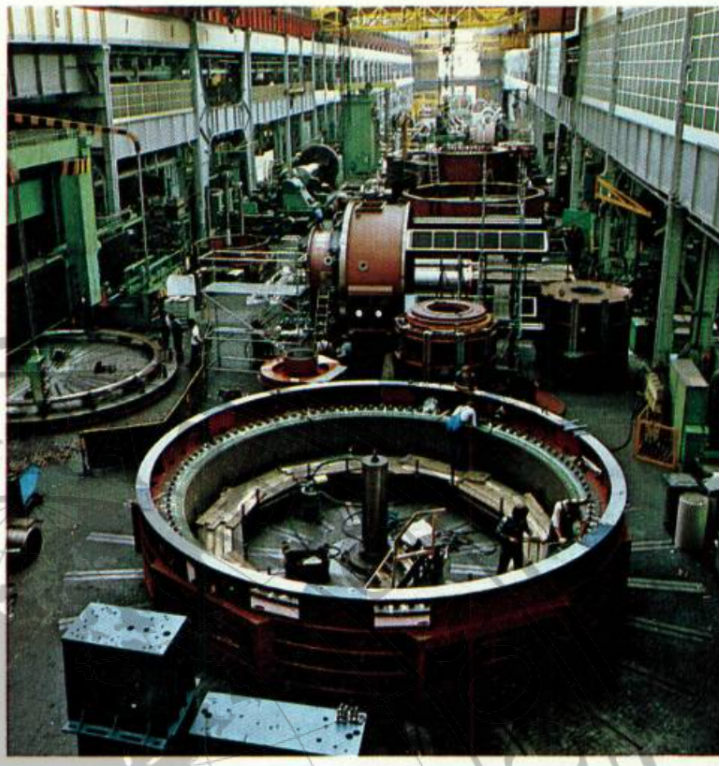
Housing Conflicts Spark Turmoil

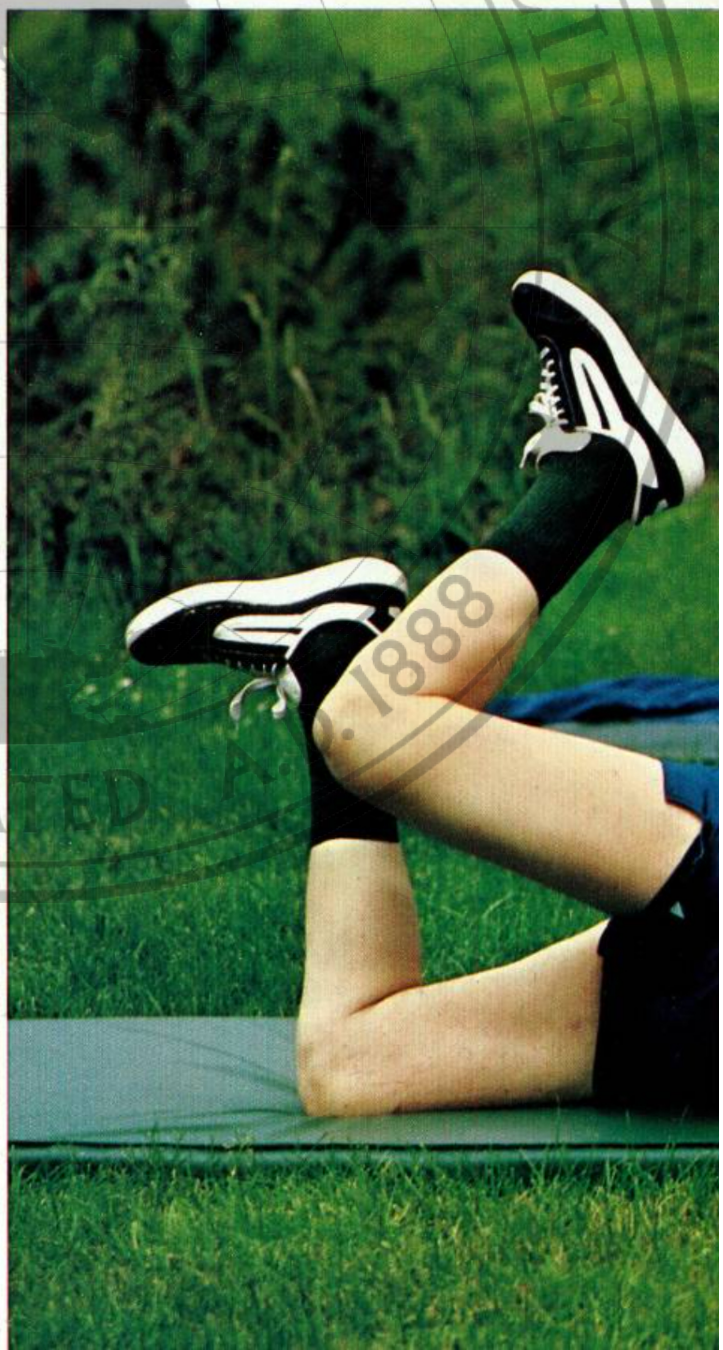
In the districts of Kreuzberg and Wedding, groups of young people who call themselves the *Instandbesetzer*—squatters—have simply moved into more than a hundred empty houses. At a run-down Kreuzberg apartment house occupied by 15 such squatters, I met a young newspaper editor named Ortrud Plarre.

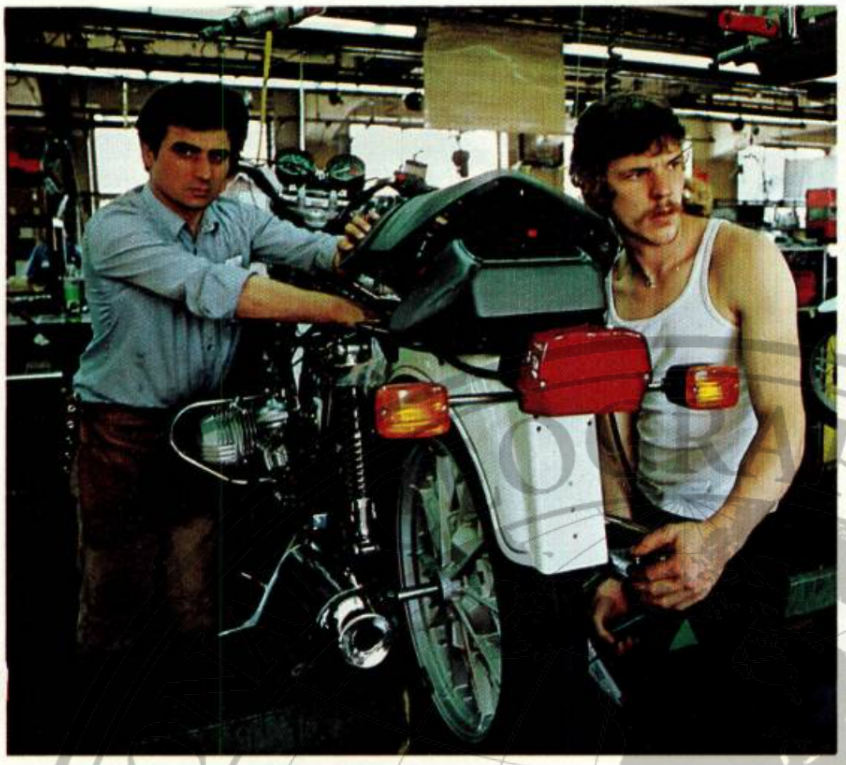
"I don't think anybody will give us the house as a present," she said. "We will have to do something for it. But this is a legitimate protest form. We don't think things like air, water, and living space should be profit-making ventures. Students can't find flats in Berlin. How could it happen that these houses were empty?"

Some landlords have countered the squatters by destroying plumbing and wiring to make the empty houses even less habitable. City Hall, faced with a sticky political dilemma, sent police to clear some of the flats, but backed off after an angry mob stalked down the Ku'damm smashing windows last December, and 14 protestors were arrested. Continuing agitation against the government's handling of the housing problem racked West Berlin all year.

My own run-in with the demonstrations came one gloomy afternoon in Kreuzberg

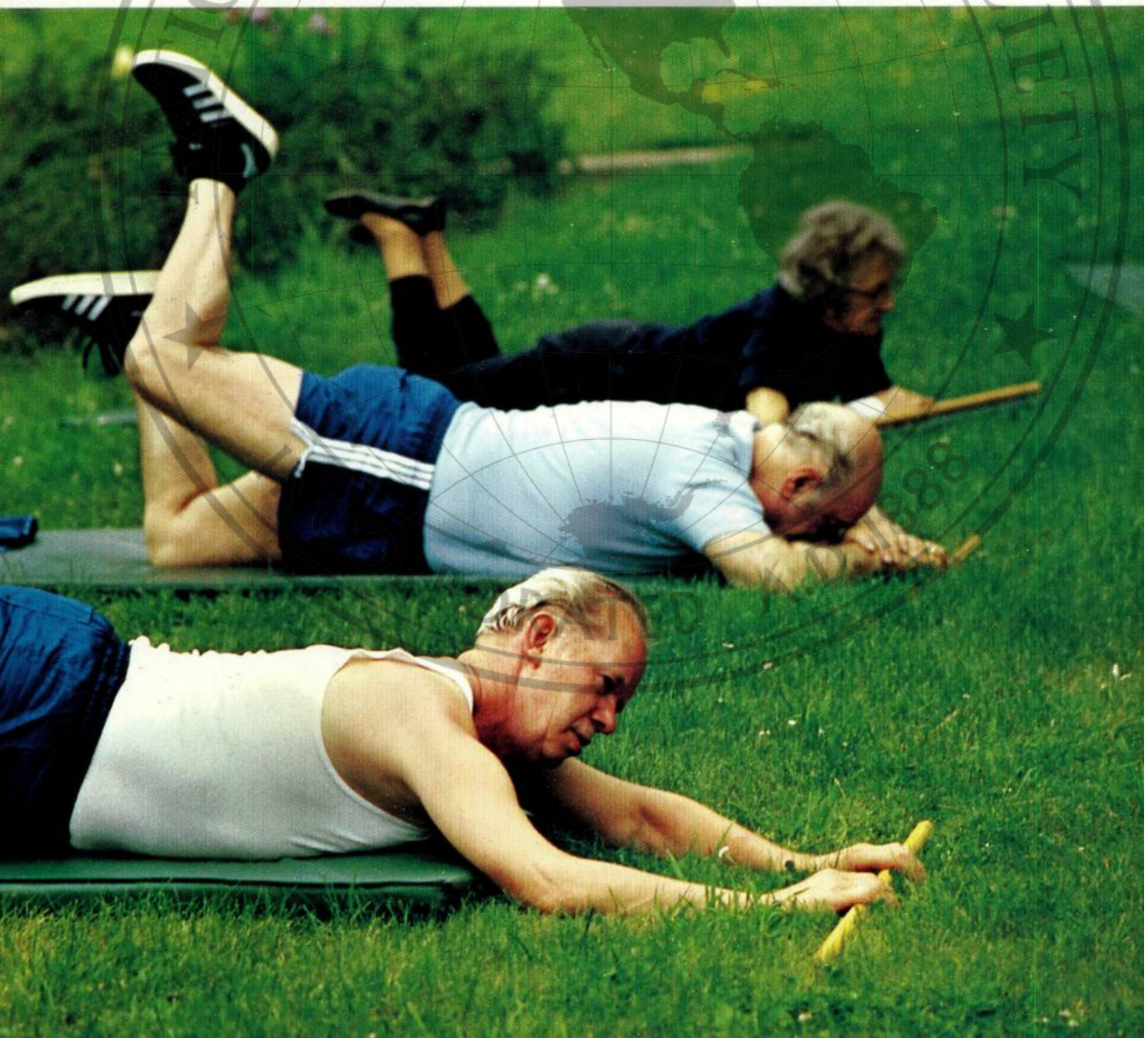


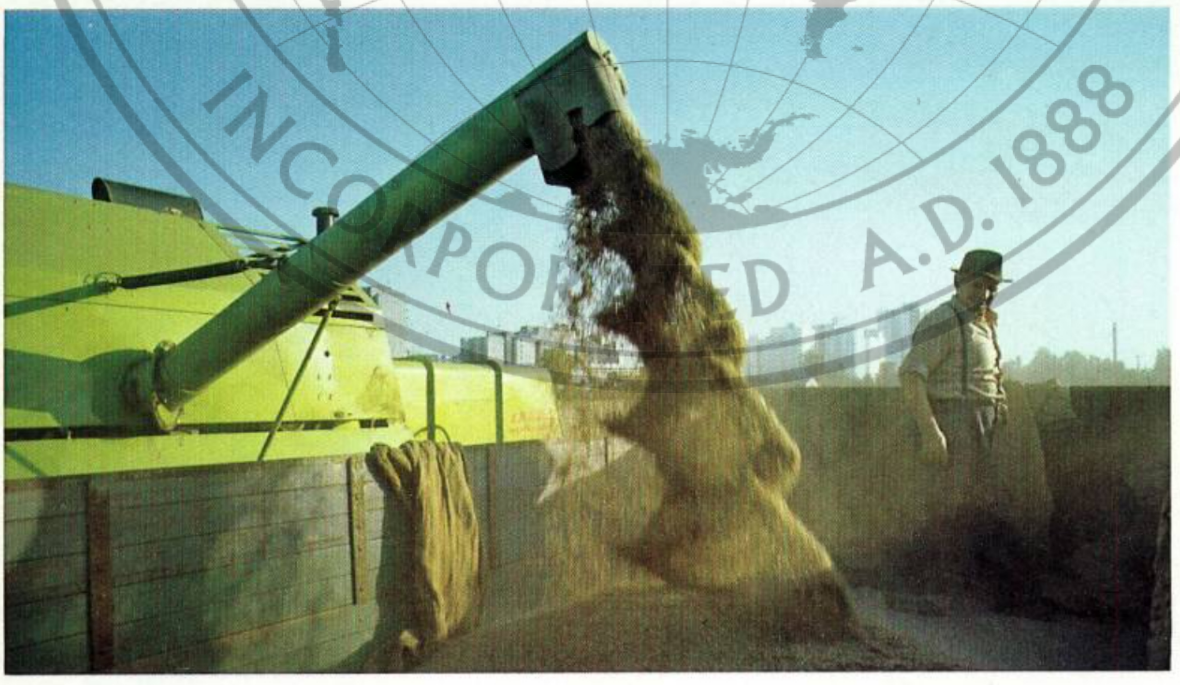




Jobs go begging *for skilled labor at such sophisticated industries as Siemens AG electric generator plant (**far left**), although 46,000 West Berliners are out of work. Siemens, with 27,000 workers, the largest private employer, offers a health club for pensioners (**below**) among benefits.*

*At BMW Motorrad plant (**left**) a Turkish guest worker, at left, helps assemble a motorcycle. Guest workers, recruited when 60,000 East Berliners were shut off from their jobs by the Wall, now form 20 percent of the work force in West Berlin.*





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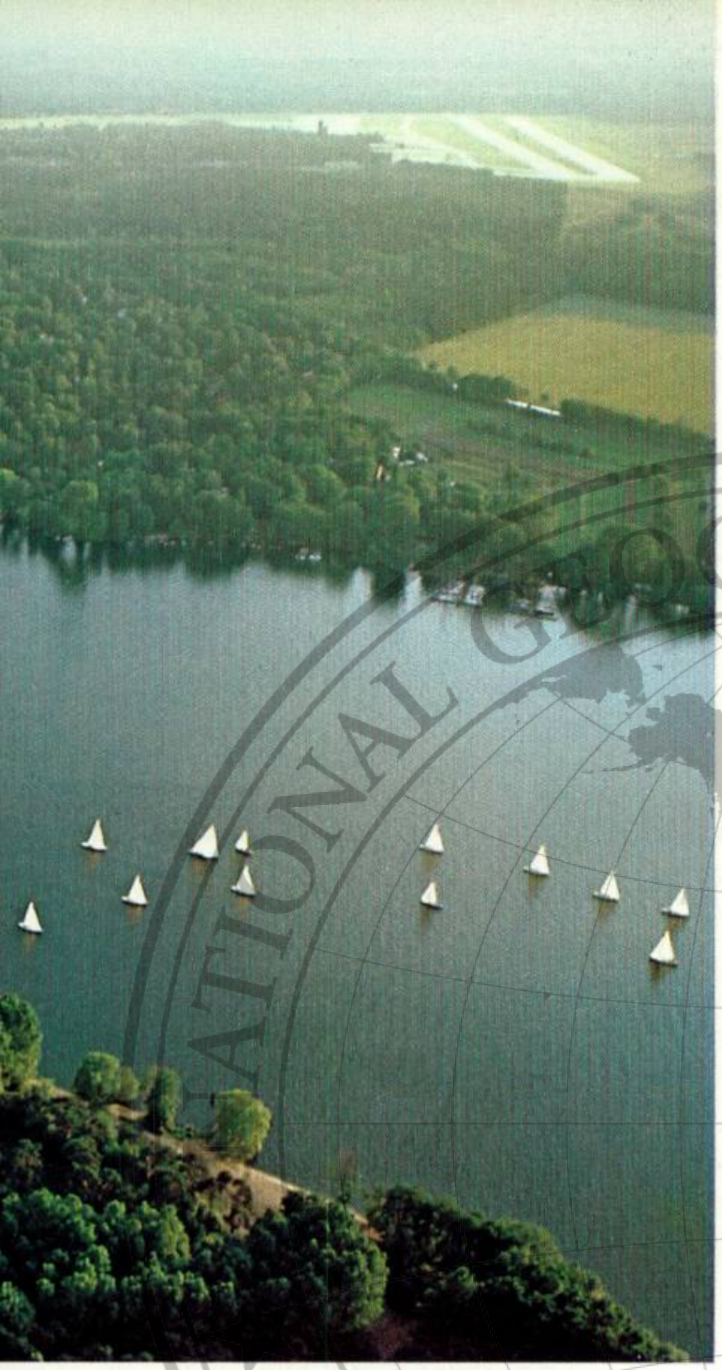
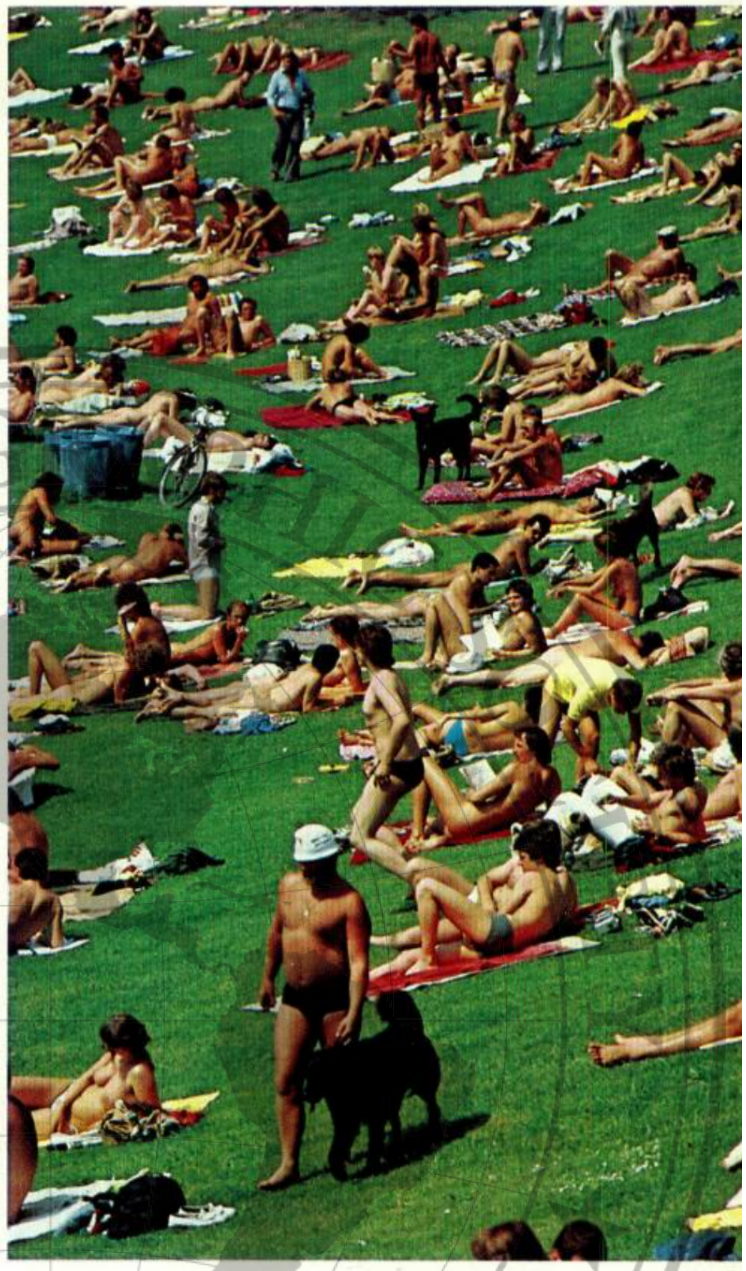




Precious breathing space *helps cure the cabin fever and soothe the tensions of isolation. The incorporation of surrounding villages into Berlin proper in 1920 stretched the city's borders, and today West Berlin's 50 square miles of lakes, parks, and forests exceed those of any other city in the world. There is space enough for a yacht race on the Havel River by the Grunewald Forest* ***(above left)****, space enough for a wheat harvest in the northern village of Lübars* ***(far left)****, and enough for fishmaster Otto Latendorf's catch of eel, pike perch, and whitefish on the Grosser Wannsee* ***(left)****. Near the city center* ***(above)*** *and a pond called Halensee, nude sunbathers practice their earnest but innocent hedonism—a Berlin tradition.*

when the streets were suddenly filled with running people, flashing blue lights, and the stomach-knotting bray of sirens. I raised my camera, and a motorcyclist, a red scarf whipping around his helmet, veered onto the sidewalk directly at me. A leather arm reached out and slammed down hard on the camera, but the strap held. His motorcycle shimmied and almost overturned, but he did not look back.

Later I spoke to one demonstrator, Dirk Wandersleben, a 20-year-old student originally from Frankfurt, over a cold beer.

"We call ourselves anarchists," he said, flushed with the excitement, "but others call us 'chaotics.' This is not political at all. We are demonstrating against the jailing of our brothers. But capitalism is the real enemy. We suffer because of it. There's no humanity between people here."

"What are you studying?" I asked him.

"Photography," he responded, "but it's almost impossible to get a job. Besides, I don't want to work for the establishment. I'm an anarchist."

"Then why did you come to Berlin?"

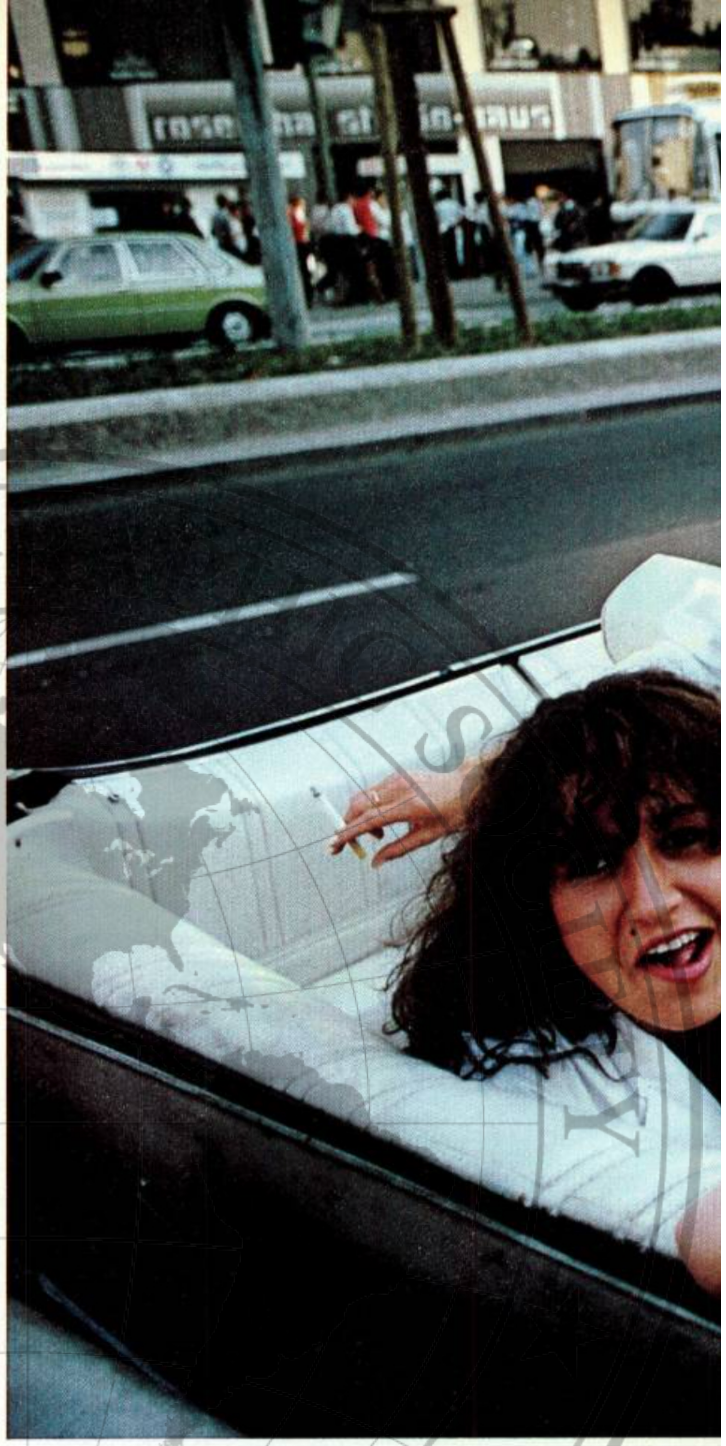
"Oh," he answered, "the state gives me 620 marks a semester to go to school here."

"On the one hand," said Mayor von Weizsäcker philosophically, "it ought to belong to the tolerant tradition of Berlin to welcome people who want to find their own way of life. On the other hand, in the past ten years some 100,000 young people of the alternative sort have come to Berlin. . . . What are they doing? They do not contribute anything. We simply cannot continue to attract people who don't want to work."

Rubble Mountains Recall Defeat

The old remember better times and worse times. At a tea meeting of the Berlin *Trümmerfrauen* (rubble ladies), ten splendid elderly women nodded over their pastry at the words of their 81-year-old president, Frau Annie Mittelstedt. "It makes me very angry to see young people breaking windows," she said. "We don't understand why the government tolerates that."

There had been 60,000 rubble ladies after the war—those who dug the city out of its wreckage with their bare hands, brick by brick. Four enormous rubble mountains in West Berlin testify to their work. One of



Show and tell *is the credo of the glittering Kurfürstendamm, a two-mile-long strip of shops, shows, and shenanigans. Both a convertible load of affluent fun seekers* ***(above)*** *and a costumed couple* ***(right)****, unrelated to the Model A Ford parked curbside, simply blend into the passing parade. Other young people eschew the "Ku'damm" as a tourist trap and inhabit a system of back-street Kneipen, or pubs, that support the myriad subcultures—punkers, gays, leftists, intellectuals—that keep West Berlin one of the least provincial cities in the world.*

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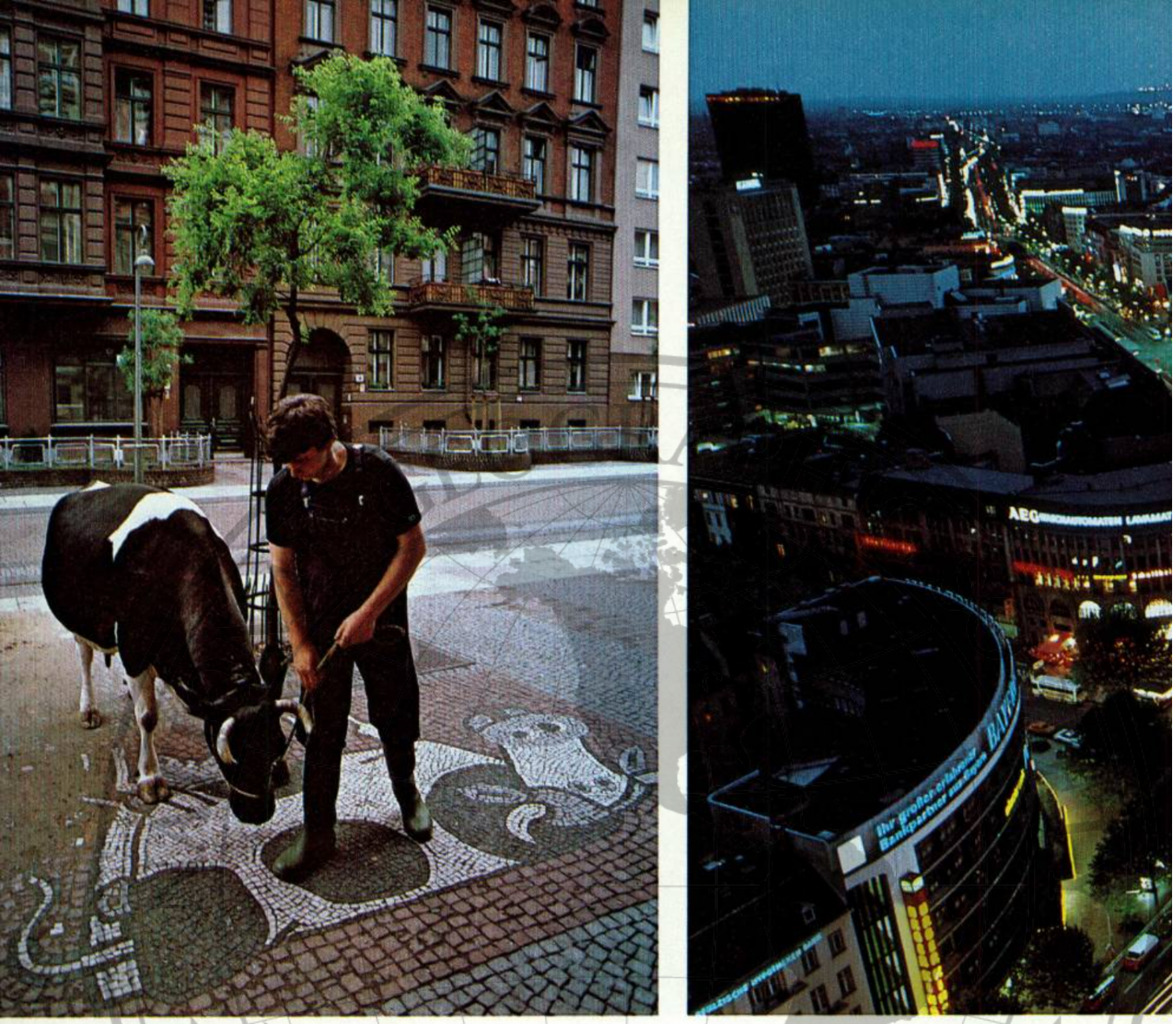


How ya gonna keep 'em down on the farm? *One of Georg Mendler's 40 cows ponders a mosaic look-alike near Mendler's Schöneberg center-city dairy* ***(above)****. Only a few blocks away West Berlin's neonscape swirls around the gap-toothed*

them, Teufelsberg, is used as a ski area.

"Whole blocks were flattened," Frau Mittelstedt remembered. "Imagine what it's like when a five-story building falls together. We often found corpses buried."

"The worst experiences were in the French sector," said Frieda Schwanke. "The French were throwing rocks at us—they thought we were all Nazis."

Frau Mittelstedt added, "Our boss put up a poster by our work site—'Here there are no Nazis.' We had nothing, but one had to live—to be optimistic."

Today's West Berlin is a city of architectural adventures, like the recently completed International Congress Center and the sweeping Philharmonic Hall, where director Herbert von Karajan conducts one of the world's finest symphony orchestras. It is also a city of architectural sadness: the gray and scarred Reichstag building; a row of shabby embassies by Tiergarten park, still owned by foreign governments, but no longer part of a world capital.

The Wall Becomes Background

The most infamous piece of architecture, the Berlin Wall, has become almost a tourist site, and its drama has dulled on the Berliners themselves. City official Dr. Dietrich Senoner told me, "You can compare it to someone with a handicap. He doesn't pay

ruins of Kaiser Wilhelm Church and its cylindrical memorial tower, scaffolded for repairs. The Ku'damm sweeps past on the left, Budapester Street on the right, bold rivers of light whose glow penetrates far into the surrounding darkness.

attention to it all the time, but others who see him for the first time see only that."

Those who have made the step from East to West often have mixed feelings. I spoke to a young doctor who had been smuggled to West Berlin in the car trunk of her fiancé, who had defected a few years earlier. For love, she insisted, not politics.

"I felt like a stranger here," she said. "I would never have guessed it, because we're all Germans. People here appear much more open at first, but it only seems like it. When you start trying to find a friend, you see that they're living for the moment. They forget you the next morning.

"My husband started studying medicine here, too, but he couldn't make it. He was used to pressure behind him. They demand so much more of a student in the GDR. Now he sells ice cream at an *Imbiss* [street stand], and we are divorced.

"Some people from the GDR have asked me, 'Why have you gone? The state has paid for your education.' Since I was small, I was taught that the state was *us*—*we* were the state. But here, I'm not made to feel guilty about disagreeing with the state. Here we have our *rights*. And I never feel guilty about demanding them.

"When you live in the GDR, you can't really see clearly," she said. "I didn't realize what they have done to us, and what they

are still doing to us. Now I can see, and it makes me angry."

In West Berlin, a city struggling with its image and its uncertain economy, the border remains a constant presence, and even in peaceful times exerts a pressure on the *Insulaner*—islanders.

In the suburb of Zehlendorf a 34-year-old government worker confided: "In my basement I have enough food for 30 days—for me, my wife, my son, and my dog. Sure, we think about an invasion. The border is only five to ten minutes away. The Russians could come on the S-Bahn [elevated railway] one morning, knock on the door of the American commandant, and say, 'OK, here we are.' And the Americans, the British, and the French couldn't do a thing about it."

Would the Western allies fight?

Maj. Gen. Calvert P. Benedict, then commandant of Berlin's U. S. forces, told me: "We'll make them pay the price for however many city blocks they want to take. All the Eastern-bloc countries are looking to us. We are still the will of the West."

In the Shadow of the Wall

In a curious sliver of land named Albrechts-Teerhofen, which sticks into the GDR like a tongue, I found a trailer camp and garden plots of West Berliners bounded on three sides by the Wall.

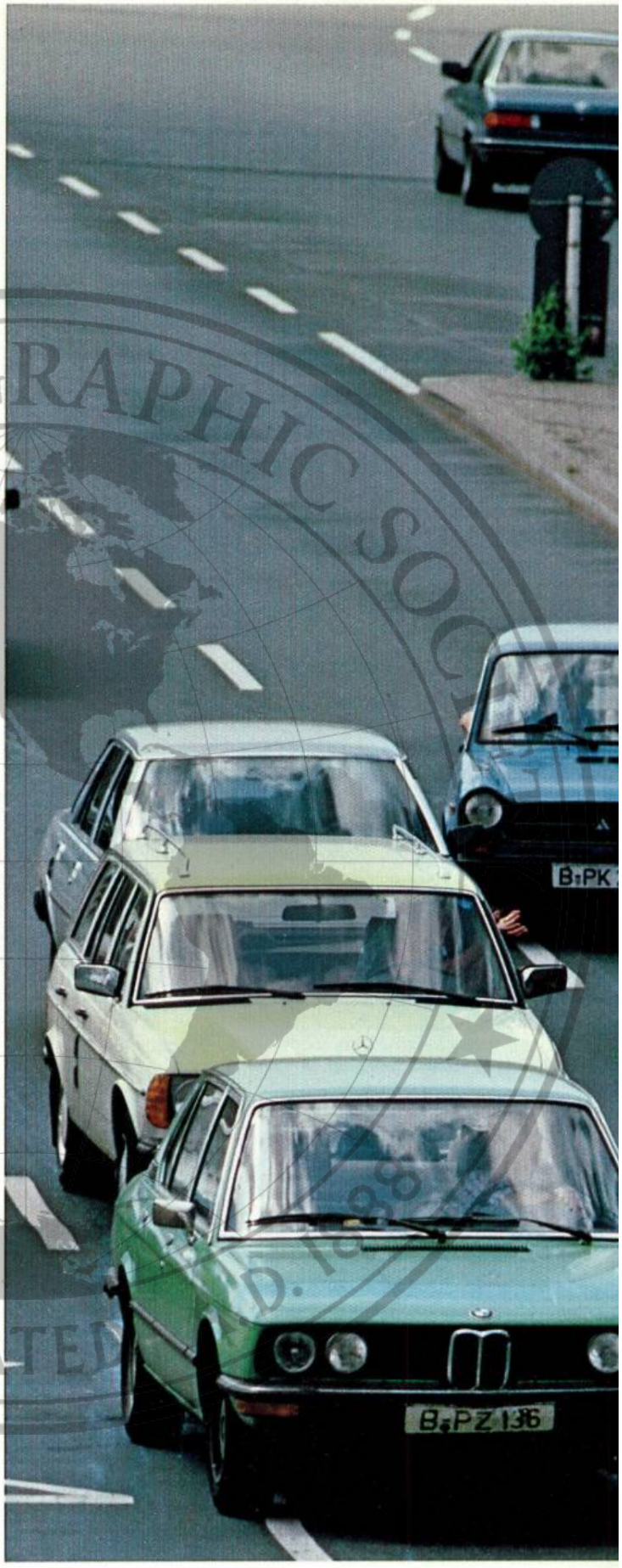
"We hear their dogs every night," said Werner Haering, a middle-aged man in a flowered T-shirt and a pair of shorts. I questioned him about vacationing in such strained conditions. Why didn't he just go to West Germany someplace?

"This is Berlin," he said, with an expansive gesture, and a cocky little smile that seemed to add: "You provincial American."

We walked together down a cracked and weedy slab of concrete that had once been an autobahn sweeping into the capital of Germany, and we stepped onto a bridge now crossing the Teltow Canal for no good reason, blocked by rolls of barbed wire.

"But what if the Russians come?" I asked. "Would you still stay in Berlin?"

His face stiffened. *"Nein . . . Nein . . . Nein!"* he fumed. "I would take my, my handkerchief [he yanked it from his pocket], my automobile, my wife, and whooooosh!" His hand glided dramatically westward. □



Strange range: *A fund raiser for the Old Texas Cowboy Club tosses a bag*

of promotional corn chips to a passing car. Berliners of such spirit prompt Mayor Richard von Weizsäcker to conclude: "In times of crisis, Berlin will not give in."

More than three and a half centuries ago, a surprise attack devastated a fragile colonial outpost—Virginia's Wolstenholme Towne

New Clues to an Old Mystery

By IVOR NOËL HUME
RESIDENT ARCHAEOLOGIST, THE COLONIAL WILLIAMSBURG FOUNDATION
Photographs by IRA BLOCK
Paintings by RICHARD SCHLECHT

"THAT WAS NO WAY to treat a lady," I thought when first I saw her lying in the rubbish pit. We had known for a full two weeks that the bones of the woman were there, after we were sure that she was more than an isolated leg; but it was not until I caught influenza that I realized how she died.

The lady we came to know as "Granny in the Ground" was the last of countless surprises that had kept us on our archaeological toes for four years, as we scraped away the centuries to reach Friday, March 22, 1622, and the ashes of Virginia's Wolstenholme Towne.

On that Friday more than three and a half centuries ago, a surprise Indian attack had devastated this fragile outpost and left at least 58 of its English settlers dead. Although a handful of survivors returned and a few replacement families were sent out to repopulate Martin's Hundred, as the surrounding plantation was called, Wolstenholme Towne was never rebuilt, and before long both its name and location were forgotten.

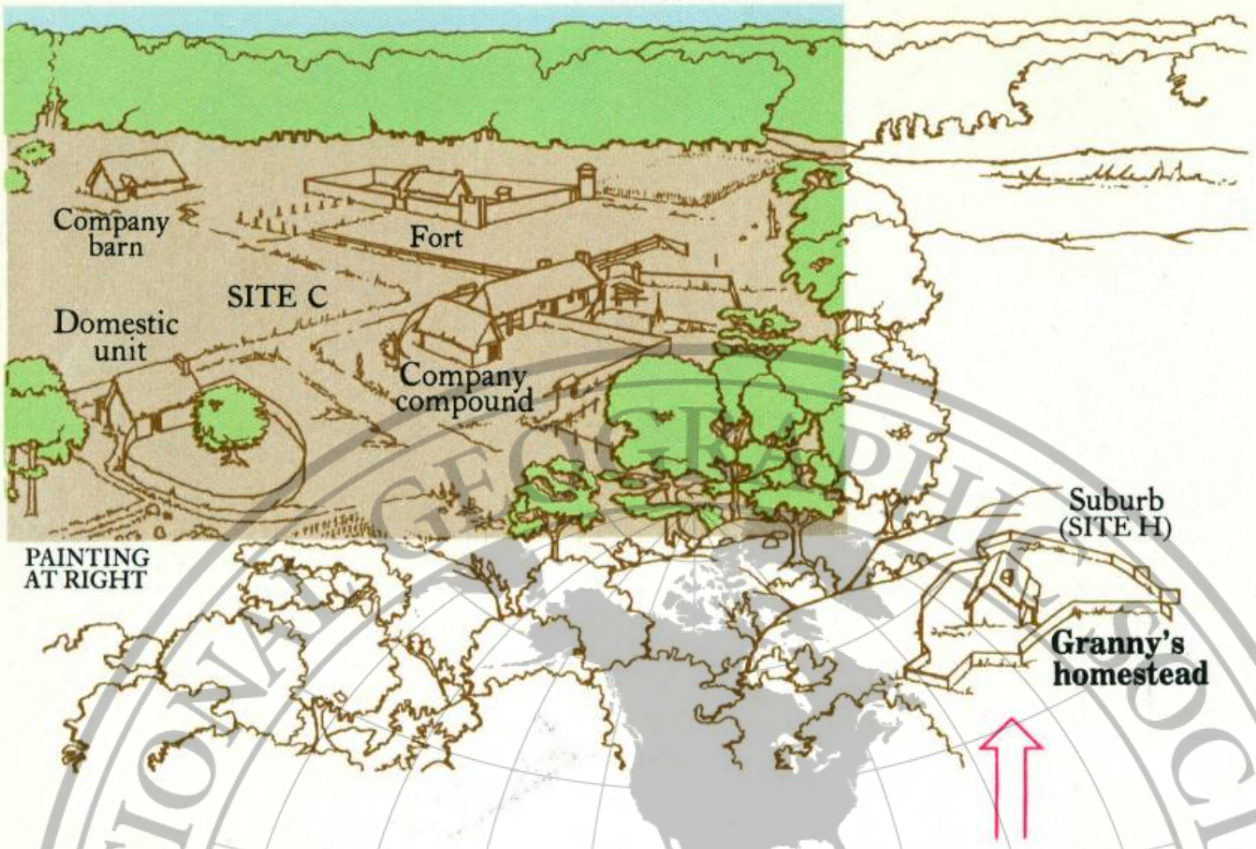
The story of how the search for later colonial remains at Carter's Grove plantation on the James River led to the discovery of the oldest British-American town plan yet excavated has been told in a previous NATIONAL GEOGRAPHIC article.* Reader responses to it came back to us from around the world, some offering valuable new avenues for research, others asking "What happened in the end?"

A reader in Pakistan told of finding distilling apparatus like the still head we had discovered on our first site; another had seen a stoneware jug from the 1628 wreck of Sweden's *Vasa* that he believed matched one we had found. Then came word from Bermuda of jars from a 1609 shipwreck paralleling fragments found in the fort at Wolstenholme Towne. Piece by piece, our puzzle was fitting together to *(Continued on page 60)*

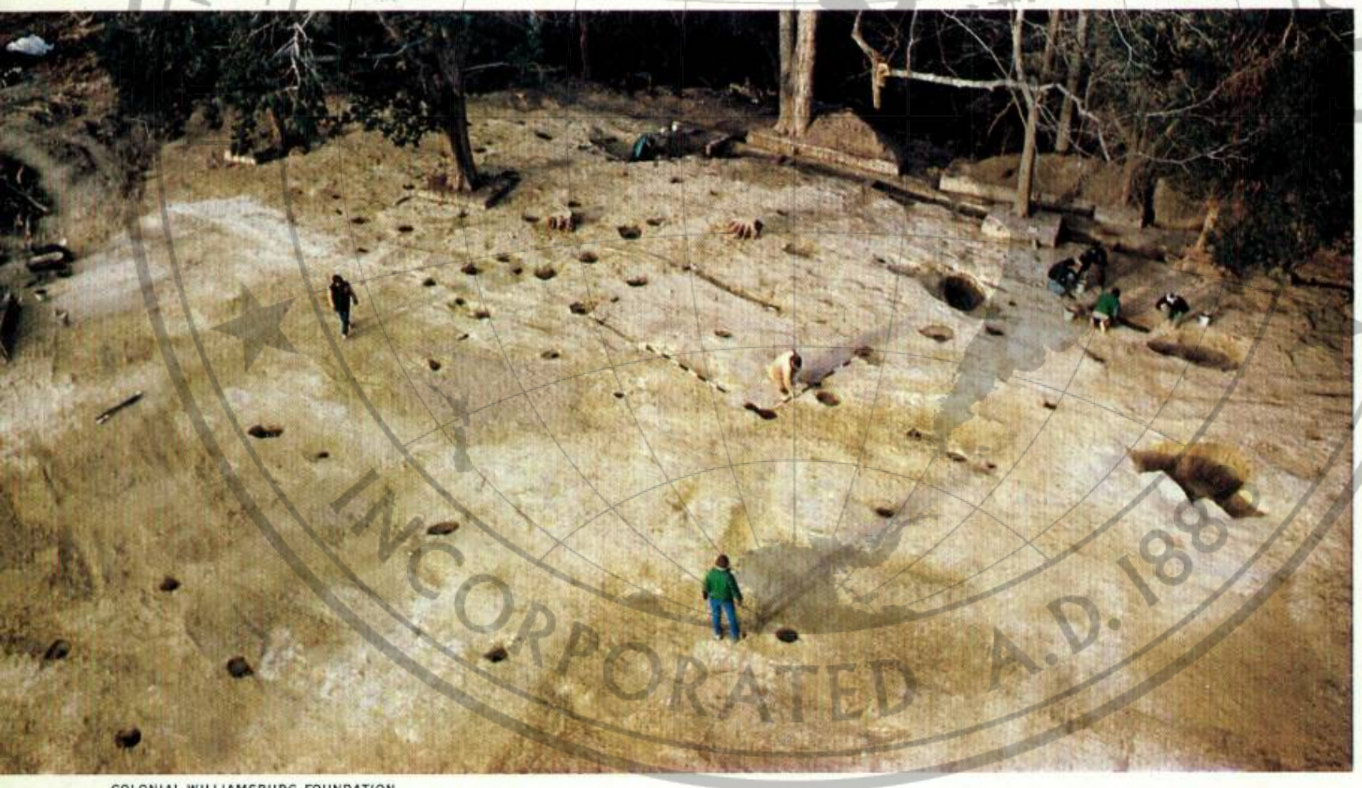
*"First Look at a Lost Virginia Settlement," by Ivor Noël Hume, June 1979.

Provoked beyond endurance *by encroachment on their land, Indians of the Powhatan Chiefdom rose against British colonists in 1622. The author theorizes how one woman was attacked and left to die (**left**); her skeleton was found outside a homestead near Wolstenholme Towne, a settlement first described in a previous GEOGRAPHIC article. New evidence, as well as information sent by readers, now adds to the story.*

NATIONAL GEOGRAPHIC ART DIVISION



SITE OF "SUBURB" IN PHOTOGRAPH BELOW LIES 500 FEET WEST OF WOLSTENHOLME TOWNE.



COLONIAL WILLIAMSBURG FOUNDATION

Scraping away more history

NATIONAL GEOGRAPHIC SOCIETY INCORPORATED A.D. 1888

WOLSTENHOLME TOWNE grows, expanded by four years of diligent archaeological spadework. The village, headquarters of a plantation called Martin's Hundred, proved the oldest British-American town plan yet excavated when discovered on the much later site of Carter's Grove near Williamsburg. A core of 30 to 40 settlers peopled the town, shown during its construction around 1620.

*Early digging revealed the site of a cottage (**above,** lower left), a company compound including a longhouse and a store, at center, and beyond, a palisaded fort. To that scene has been added the largest single building—the company barn, at upper left. There the colonists probably stored their exports of tobacco and lumber prior to shipping them to England. The position of the barn adds weight to the author's belief that the town plan paralleled a design used by English colonists in Ireland during the same period.*

*An equally dramatic find, discovered after the painting's completion, was what the archaeologists dubbed the "Suburb" (**far left**). Postholes define a homestead where at least seven people died. Four were buried together, probably victims of a contagion. But the others may have met a violent end, including the woman depicted on page 52, the grim discovery reinforced by signs that the house had burned, probably put to the torch.*

INCORPORATED A.D. 1888

A web of evidence stretching around

MORE QUESTIONS than answers were often raised by fragments of glass, pottery, or metal found on sites across Martin's Hundred and in Wolstenholme Towne. What precise period of settlement did they indicate? Had they examples elsewhere?

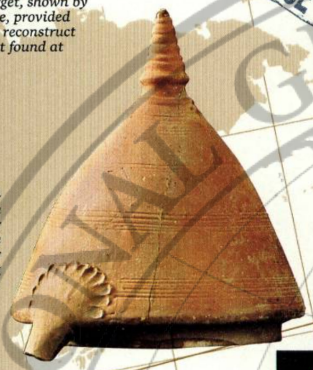
Verifying ties came from a Dutch shipwreck off Australia, from a mountainous Caribbean island, and from England and Turkey, even from the grave. After the first GEOGRAPHIC article on the settlement's discovery, readers wrote to offer help based on their family histories or from artifacts seen elsewhere.

CRL OFFICE COPY

Tower of London
An early 17th-century pikeman's armored collar called a gorget, shown by Yeoman Warder Joe Hubble, provided fastening details needed to reconstruct fragments of another gorget found at Wolstenholme Towne.

Cardiff, Wales
Brass brazier in the National Museum of Wales (left) has a handle so similar to another from the settlement (below left) that both may have been made by the same craftsman.

Wolstenholme Towne
Though the hub of Martin's Hundred was destroyed by Indians in 1622, some farms lived on to become part of 18th-century Carter's Grove.



Karachi, Pakistan
A reader wrote that this still head, or alembic, from the settlement recalled similar distilling methods long practiced in the East.

PATRICK BAKER, WESTERN AUSTRALIA MUSEUM

Western Australia
The 1629 wreck of the Dutch East Indiaman Batavia on a coral reef of the Wallabi Group yielded this German stoneware bottle. Its decorative coat of arms matches fragments from the Wolstenholme Suburb.

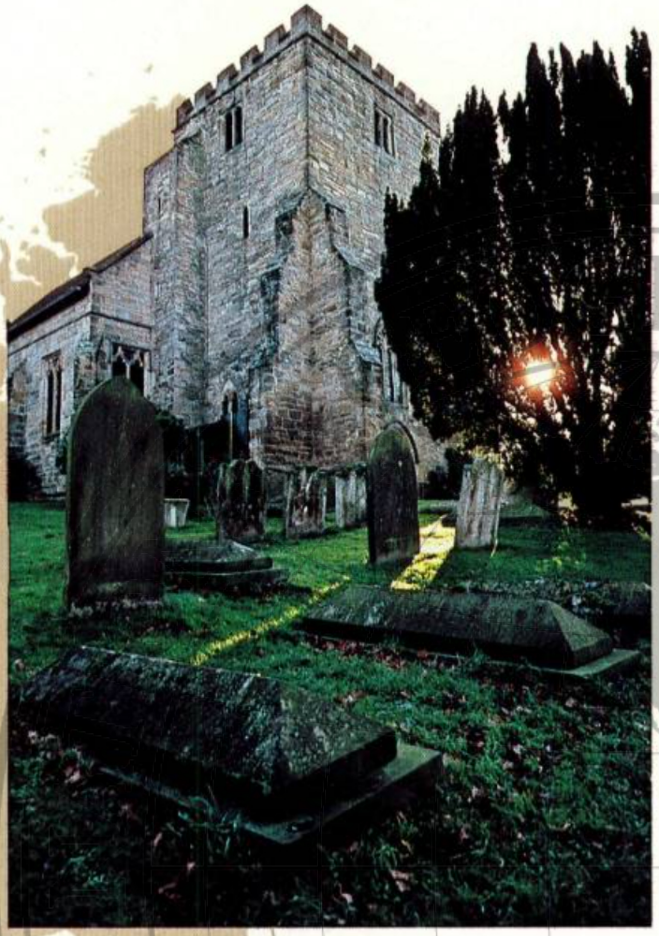
St. Eustatius
Found on this tiny island, colonized by the Dutch in 1636, a piece of tin-glazed earthenware (in hand) matched the design of a Martin's Hundred plate.

Stockholm
Cardiff
Dalkey
Rotterdam
London
EUROPE
Graz
Ankara
NORTH AMERICA
Wolstenholme Towne
Bermuda
St. Eustatius
AFRICA
ASIA
Karachi
INDIA
SOUTH AMERICA
Wallabi Group
AUSTRALIA

DRAWN BY JAMES E. MCCLELLAND
COMPILED BY JOHN R. TREIBER
NATIONAL GEOGRAPHIC ART DIVISION
ALL PHOTOGRAPHS BY IRA BLOCK EXCEPT WHERE NOTED

NATIONAL GEOGRAPHIC SOCIETY
INCORPORATED A.D. 1888

the world



Withyham, England

Gabled tombs at the Church of St. Michael and All Angels hint at a precedent for the style of colonists' coffins. A vault beneath the church gave direct evidence of A-shaped lids.

River Thames

Found on its shore, a lead seal, left, identified textiles made in Augsburg, Germany. The seal matches eight from the settlement, including one at right—evidence of German textiles shipped from England.

NATIONAL GEOGRAPHIC PHOTOGRAPHER JOSEPH H. BAILEY

Rotterdam

A famous Dutch dissident escaped from prison in 1621, using as a disguise a bricklayer's jacket with buttons that matched and dated this one found in the Wolstenholme Suburb.

Ankara, Turkey

The search for proof that 17th-century coffins at Martin's Hundred had been made with gabled lids, rather than flat ones, led to the Middle East. There a Turkish carpenter carries on an old tradition, building coffins with A-shaped lids that may echo the way English colonists were buried in Virginia.

M. ALI DOĞENCI

Dalkey, Ireland

A GEOGRAPHIC reader's family records told of an ancestor who had been a licensed distiller in an Irish settlement, suggesting that the more than 100 broken bottles at a Martin's Hundred site may have been those of a distiller. From Stockholm, another reader tied such wares to those of a 1628 Swedish wreck, the Vasa.

(Continued from page 53) create a picture of life on the frontier of European civilization at the beginning of the 17th century.

Before we were through, the net of evidence would reach from an Australian reef to a military arsenal in central Europe, to the foreshore of the Thames at London, by way of a Turkish coffin builder, and an ingenious escape from a Dutch prison.

Meanwhile, the digging was still going on. By the winter of 1978 we had found what we believed to be Wolstenholme's fort, as well as a row-house building we identified as a dwelling for settlement employees, plus a store, one tenant's home, and 16 graves. We knew from the records that there had been a church, but we hadn't found it.

BOTH DOCUMENTARY and physical evidence told us that the banks of the James River have been heavily eroded through the centuries, receding as much as a yard a year. The bluff on which Wolstenholme stood may have been reduced by 280 feet or more since the early 17th century, meaning that if its buildings once reached to the shore, we now have only half of the site left. Even so, the settlement could never have been very large and was unlikely to have housed more than about 40 people.

Remembering that those who set out in 1618 aboard the ship *Gift of God* numbered no more than 220, and that according to the records the total Martin's Hundred population at any one time never exceeded 280, a core settlement of 40 people makes sense. After all, grants to the Society of Martin's Hundred gave it at least 21,500 acres, and its English settlers were there to clear, build, and farm on behalf of London shareholders, not to cluster in a knot at the river's edge.

Everything pointed to Wolstenholme Towne (which was really no more than a village) being only the administrative center for Martin's Hundred. It was the seat of its governor, William Harwood, the place where the company's employees lived, where its supplies were housed, where its produce was collected prior to shipment, and where the settlers could take refuge—if they had time.

By the spring of 1979 we had found nine sites and excavated four. Of the remainder, the one we called Site D was the most inviting; test trenches had yielded some of the best quality potsherds found anywhere in Martin's Hundred, pointing to the presence there of someone of stature in this minicolony. First, however, project supervisor Eric Klingelhofer reminded me that the 1971 testing had located yet another site—designated H—closer to the village.

"But," I countered, "all they found was a single hole in the ground: only one potsherd, a couple of musket balls, and some rotted tree branches—perhaps a 17th-century hunting blind."

"I know," Eric replied. "But before we pull up all our water-hose lines, I have a feeling we ought to take another look." He used the hoses to wet the clay subsoil and show up faint discolorations created by backfilled postholes. The water also softened the sun-baked surface enough for it to be scraped with hoes and trowels.

Reluctantly I agreed to divide the crew and work both sites simultaneously. Crew members assigned to Eric's quest grumbled at being left out of the action about to begin at Site D. For three years my wife, Audrey, the project historian, had been urging us to move there, believing that it would yield crucial information about the development of the Hundred. I did not doubt that she was right. Although marked D on our maps, it was always referred to as "Audrey's Site," the place where all lost truths would be revealed unto us.

After a month's scraping in 100°F shadeless heat, one grim truth emerged. Site D was barren. Meanwhile, back on Site H, artifacts and postholes were showing up everywhere.

The hunters' pit turned out to be a grave, and the rotted tree branches the bones of four people—the first multiple burial recorded from an early 17th-century colonial site in Virginia. All evidence pointed to hasty, clothed burial, unusual in that day, and probably due to fear of contagious disease. The bodies had been laid head to toe in a manner paralleled in an English engraving showing the burial of London plague victims in 1665.

Site H was located only 500 feet from Wolstenholme Towne, and as excavation proceeded we came to call it the "Suburb."

Before long the plan of another palisaded dwelling emerged, a triangular enclosure with boxlike projections called flankers at two of its corners, and with a house inside it. Although the character of the dwelling was uncertain, we had no doubt as to its fate. Ashes, the remains of a burned post ringed by scorched clay, and the skeletons of three women were still vivid testimony to what must have happened there on what an eyewitness described as "that fatall Friday morning" in March 1622.

In all, four years' digging in Martin's Hundred revealed the graves of 49 colonists, very few of them identifiably victims of foul play. Most lay unboxed in the ground, but six, one of them an infant, were in coffins. In each instance a row of large nails lay down the center line of the body, having fallen from the coffin's decaying lid. But coffin lids are normally made from a single board and need no nails down the middle.

At first I read the central nails as the peculiarity of a local coffin builder. We called him the crazy coffin maker of Carter's Grove—though not for long. When I learned that some 30 miles farther upriver at Flowerdew Hundred two more 17th-century skeletons had been found with similarly placed nails, I realized that the problem was in *our* minds; we simply knew too little about early colonial coffin construction.

WE WERE NOT ALONE. Letters to archaeologists and historians in England yielded no descriptions of how 17th-century coffins were built; but as had happened so often in the course of our research, clues were to be found in paintings, engravings, and woodcuts of contemporary life. Some came from cautionary broadsheets warning against the horrors of plague, and all showed coffins whose lids were not flat but gabled (next page). I was sure that this had to be the explanation for our central row of nails.

Further research convinced me that the A-shaped lids were so designed to enable decorated palls draped over them to be seen to the best advantage as the funeral procession made its way to the grave. Such ceremony would not have accompanied Site B's infant to its little grave only ten feet from the house. No, the box was made that way because tradition dictated it. To prove my point, however, I had to find a surviving gable-lidded coffin in an English burial vault, whose construction and nail placement I could measure and draw.

But where was I to find such a vault? I sought permission to explore the crypts of Westminster Abbey but was told that I could do so only if I could first prove that such a coffin existed there! Acting on the advice of the Bishop of London, I sought the help of the Council for Places of Worship which, in turn, referred my inquiry to a distinguished ecclesiastical antiquary, who stated with conviction that "There is no hope of Mr. Hume finding an A-lidded coffin in any vault in England. Such coffins were never generally used in England."

I SHALL NEVER BE quite sure why I persisted. But by this time my quest had become an obsession akin to that of Herman Melville's Captain Ahab in his pursuit of the white whale. I was sure I was right. Didn't I have pictures to prove it? At the same time I had to admit that gable lids would have been much more trouble to make, and peaked coffins could not have been stacked on top of one another in vaults and tombs.

That problem was in Audrey's mind when she read that earlier in the present century author Victoria Sackville-West had visited the vault of her ancestors in the church at Withyham in Sussex, and there had gone down into "a small, dark cave underground, beneath the church, among grey veils of cobwebs [where] the coffins of the Sackvilles are stacked on shelves. . . ."

If housed on shelves, the coffins were unlikely to be piled one upon another. Furthermore, Audrey had discovered that at least two Sackvilles had been interred there in *our* period—the first half of the 17th century. I sought family permission to open the vault, first from Lord Sackville and then from its custodian, Earl De La Warr. Permission was granted, and Lord De La Warr volunteered to open the vault personally.

When he unlocked the iron grille and we descended the steps beneath the Sackville chapel, my heart sank. Before us stretched rows of great, velvet-covered coffins, their

FROM "MONARCHY OR NO MONARCHY" BY WILLIAM LILLY (LONDON, 1651). ORIGINAL IN THE BODLEIAN LIBRARY, OXFORD

Tale of a nail: *Why, in the case of every settler worthy of a coffin, had nails* ***(below)*** *fallen in a row along the skeleton's center after the lid rotted? The lids were not flat but gabled, the author deduced, and probed crypts in distant parts of the world to prove it.*

Coffins in a 1651 English broadside that foretold the Great Plague of 1665 gave a clue ***(above)****. From the Sackville family vault in England came the proof* ***(facing page)****. Gardener Robert Snashfold lights up the leaden inner casket, dated 1649, of the infant daughter of the fifth Earl of Dorset. The outer lid was probably thus crafted to display a funeral pall.*

hardware royally gilded, some with coronets resting on their lids—their *flat* lids. Then I saw that there were more. The coffins lay two and three deep on the shelves, the most recent to the front. Those that were oldest had lost their wood, and only their lead linings remained. But one of those lead boxes was gable lidded.

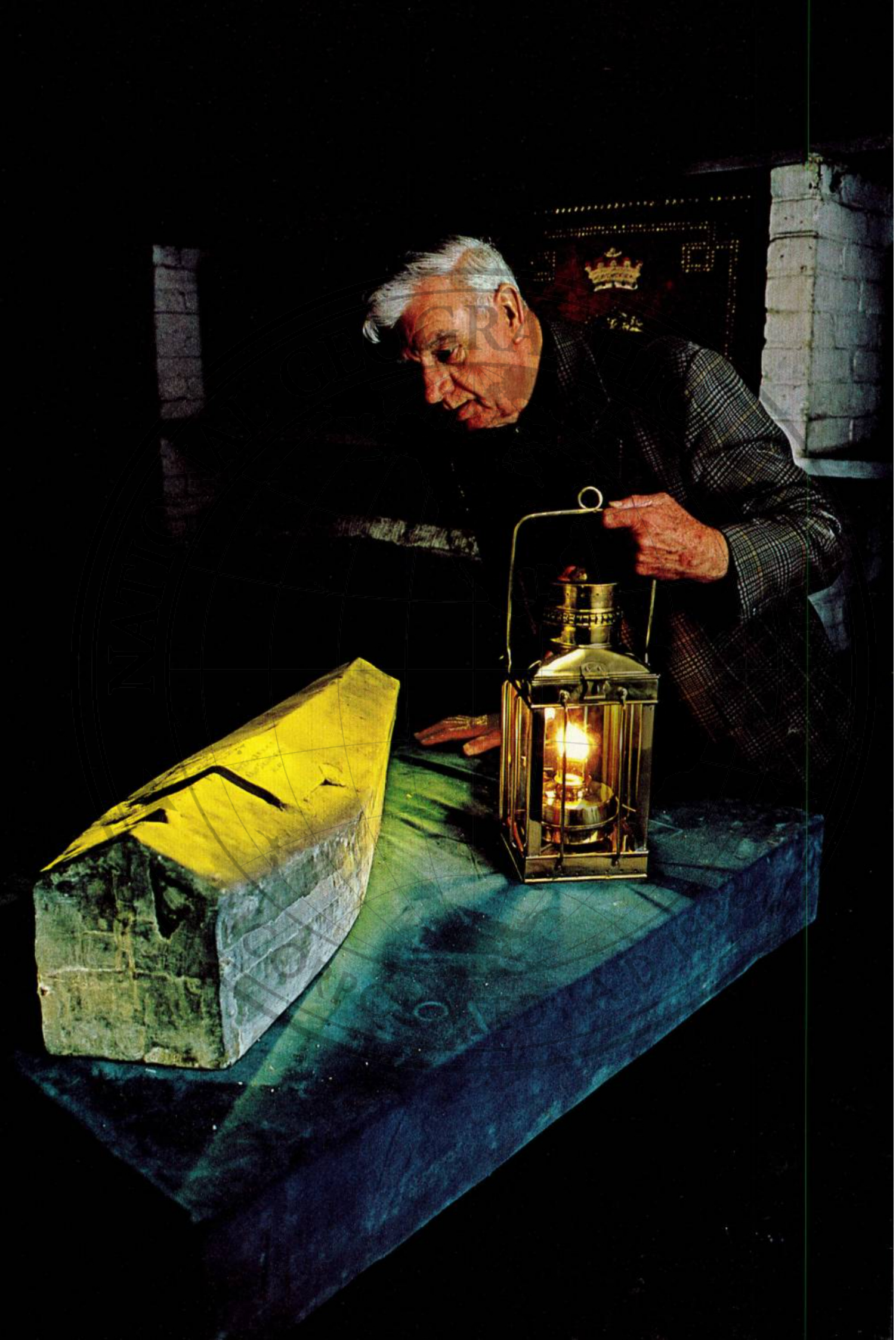
While I was still examining it and searching for any clue to its date, Audrey had moved farther down the line of shelves. "Here's another!" she cried. "And it has an inscription!"

With the help of Lord De La Warr and his gardener, Robert Snashfold, we lifted the leaden box out onto a table in the middle of the vault, and wiped the dust from the inscribed panel identifying it as the coffin of three-year-old Lady Anne Sackville, daughter of the fifth Earl of Dorset. She had died in 1649 (right).

Here at last was physical proof that gable-lidded coffins did exist in 17th-century England. Alas, any evidence of their wood and nail placement had been swept out of the Sackville vault in an enthusiastic bout of spring cleaning earlier in the present century. But we were not done yet. In Egypt, in July 1980, the Shah of Iran went to his grave in a gable-lidded coffin, and a week later two murdered Turkish politicians had been pictured in similar coffins. Writing from his great archaeological site at Aphrodisias in Turkey, Professor Kenan T. Erim has since shown us that gable-lidded coffins built in Turkey today parallel our reconstructions of the Martin's Hundred remains.

That electrifying moment when, after years of searching, one cries "Eureka!" should linger to be savored again and again, yet almost at once I felt a sense, not of elation, but of loss. The excitement of the chase had been more satisfying than the kill. Fortunately for us, however, we had other white whales to hunt.

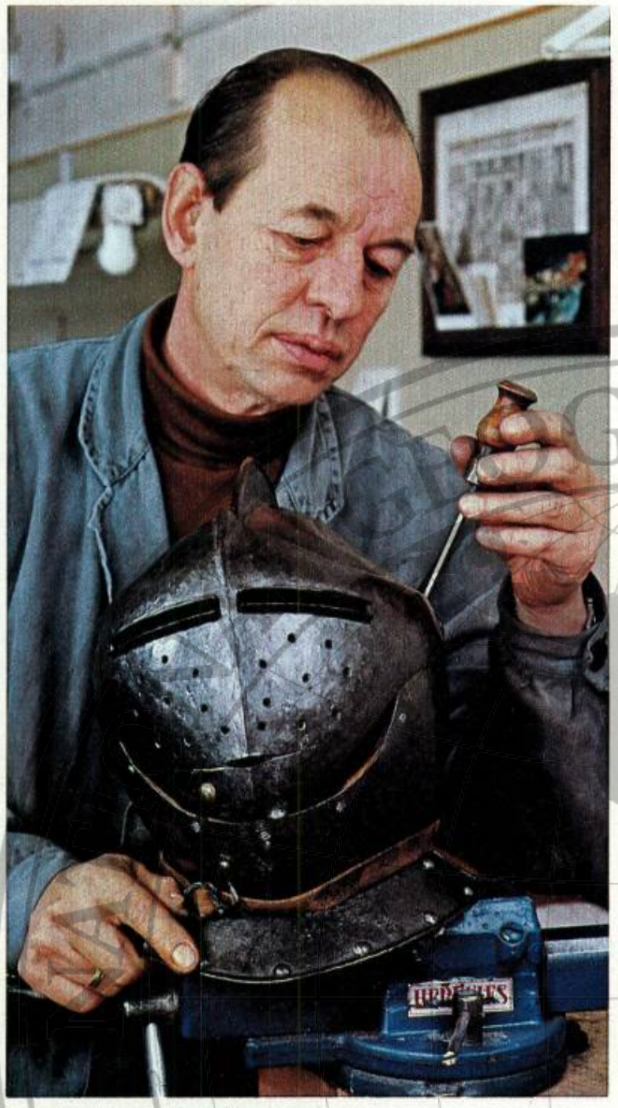
OUT OF A RUBBISH-LADEN pit on our suburban site came a plate from a suit of armor, a piece known as a tasset and worn over the upper thigh. Such plates normally were made in one of two types, but this was a hybrid for which we could find no match in museum collections. We had had the same problem in 1977 and



Arms and armor retired for 300 years *led the author to Graz, Austria, capital of the province of Styria. It served as a bulwark of Europe's defense against the Ottoman Turks in the 16th and 17th centuries. In 1749, after the wars were won, Austria's Empress Maria Theresa decreed that the arsenal forever be preserved as a memorial to Styrian bravery. Here, amid nearly 30,000 weapons and pieces of*

armor, the author found parallels for those used by Wolstenholme Towne's soldiers of misfortune. Their helmets are echoed by those of cavalry armor, foreground. A powder flask from the settlement matches the ones hanging along horizontal beams above two racks of matchlock muskets. Inverted helmets called cabassets, the standard infantryman's "pot," stud the ceiling.

A storehouse of arms and armor casts further light on Wolstenholme



*MISSING LINKS to the settlers' weaponry were forged by the stunning collection at Graz. Chief conservator August Gschiel (**above**) services an Austrian helmet made in 1601, similar to one from the settlement in Virginia (**above right**). Asked if the arsenal could match a Martin's Hundred scourer for cleaning musket barrels (**right**), curator Peter Krenn replied that he had more than 800, and showed how one screwed into a ramrod (**far right**).*

"I was utterly floored by Graz," says the author. He had begun his search at more famous museums such as the Tower of London. There he was unable to find close parallels with the ordinary-type armor of Wolstenholme Towne. The settlement's armor represents a transitional phase in a period when armor was becoming heavier, yet covered less of the body, as gunpowder played an increasing role in warfare. Mr. Noël Hume's attention was riveted when he finally saw the rank-and-file pieces at Graz: "It was as if the Austrian quartermaster had assembled the collection especially for me."

1978 when we had found our two close helmets. It became evident that little attention had been paid to run-of-the-mill munition armor used in Europe in the first quarter of the 17th century. As one distinguished curator put it: "If it is not pretty, it is not interesting." Time and again experts looked at our drawings, shook their heads, and asked: Have you tried Graz?

At Graz, Austria, there survives a collection of nearly 30,000 weapons and pieces of armor (pages 64-5), assembled not by museum curators interested in the art of the armorer but by 16th- and 17th-century quartermasters outfitting Austrian forces against the invading Turks.

In the Landeszeughaus, provincial arsenal, at Graz we were to find our link. Here were the closest parallels to our helmets. Here, too, powder flasks with nozzles like ours hung from the beams like bats in a cave. A tool called a scourer, used to clean musket barrels, had turned up on Site H. But although the device was known to us from 17th-century drawings, not one survived in the armory at the Tower of London. I showed a drawing of ours to Landeszeughaus curator, Dr. Peter Krenn. Recognizing it at once, he produced six of different sizes, one exactly like ours (left). "Do you have any more?" I asked.

"More than 800," he replied.

As I looked down the seemingly endless racks of matchlock muskets, I thought that this must have been how the Tower of London's armory looked when James I ordered it to provide the Virginia Company with replacements for equipment lost in the 1622 Indian uprising.

Some of our problems had persisted for years without our getting any closer to a solution. One was the meaning of more than a hundred broken glass bottles found on the site we believed to have been the home of Governor Harwood. No known inventory from this period shows any Virginia household possessing more than five.

It was a NATIONAL GEOGRAPHIC reader who offered a plausible answer. Writing from Dalkey, in County Dublin, Ireland, Miss Jane Protheroe-Beynon explained that she was a descendant of Sir John Jephson, an Englishman who had controlled a Munster plantation in 1610. Quoting family records, she showed that he had been granted a license to sell all wine, ale, beer, and aqua vitae to that settlement for a yearly license fee of two pounds, ten shillings. Could this explain the presence on our site of all those bottles and the equipment needed to distill alcohol? asked Miss Protheroe-Beynon. It certainly could—though we have yet to find a comparable document from Virginia.

The bottles in question, being flat sided, were extremely fragile and rarely survive intact. We knew of no whole specimens that could be dated to this early period until, following another reader's lead, I went to Stockholm to examine artifacts from the 1628 wreck of the warship *Vasa*. One of its glass bottles closely paralleled ours.

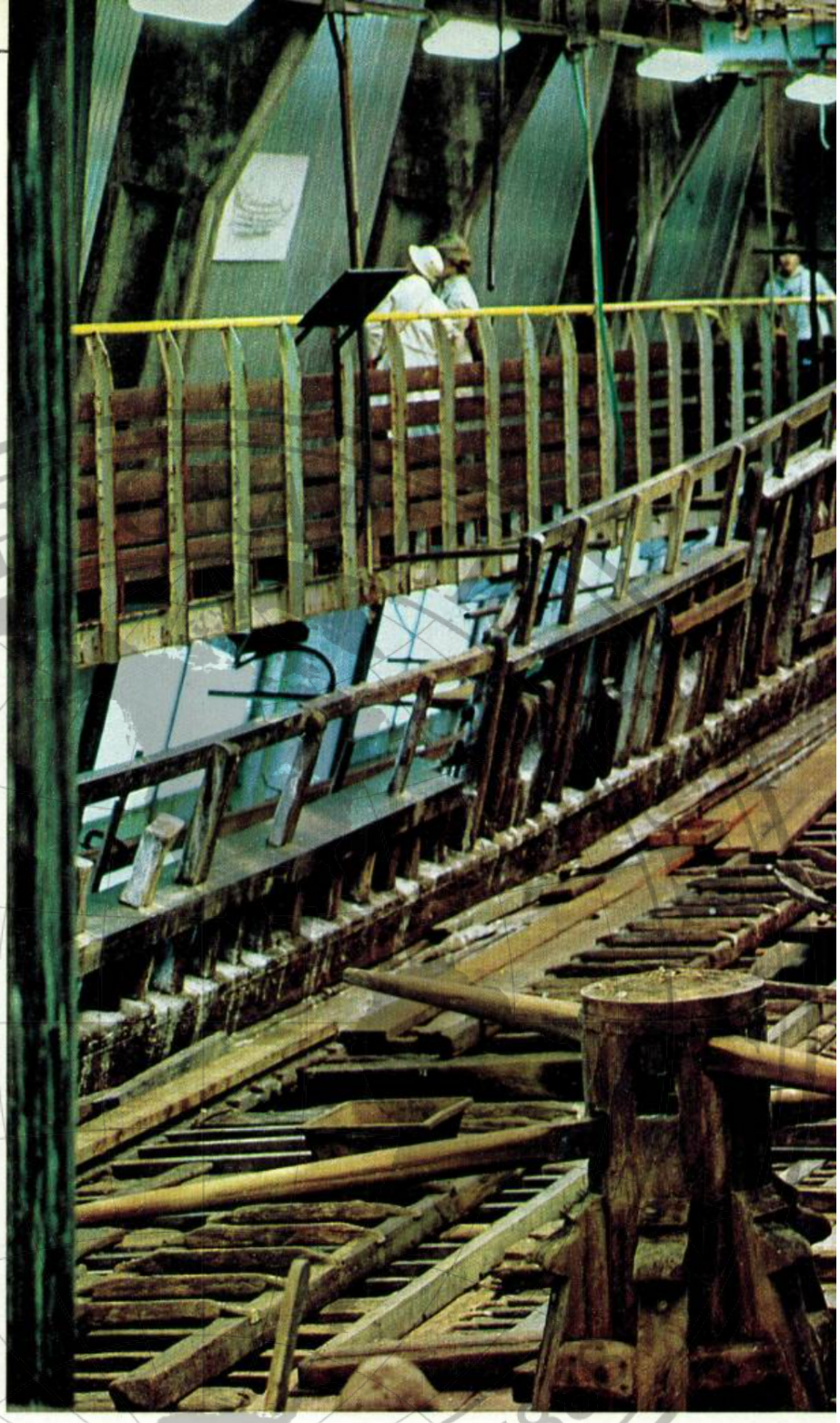
SHIPWRECKS are usually thought of as sources of treasure—chests bursting with gems and Spanish gold; but to the archaeologist they offer something far more valuable: capsules of contemporary life arrested at a single, horrifying moment as the ship went down. Two Bermudian wrecks held particular promise for us. One had been on its way to Virginia in 1609, and the other was lost in 1619 while anchored in Castle Harbour.

The older of the two wrecks is by far the more famous. The *Sea Venture* ran onto a reef after a hurricane, giving William Shakespeare an opening scene for *The Tempest*. It gave me evidence that a distinctive kind of jar, made in the west of England, was on its way to America as early as 1609. That was comforting to know, because we had found fragments of several of them in Wolstenholme's fort.

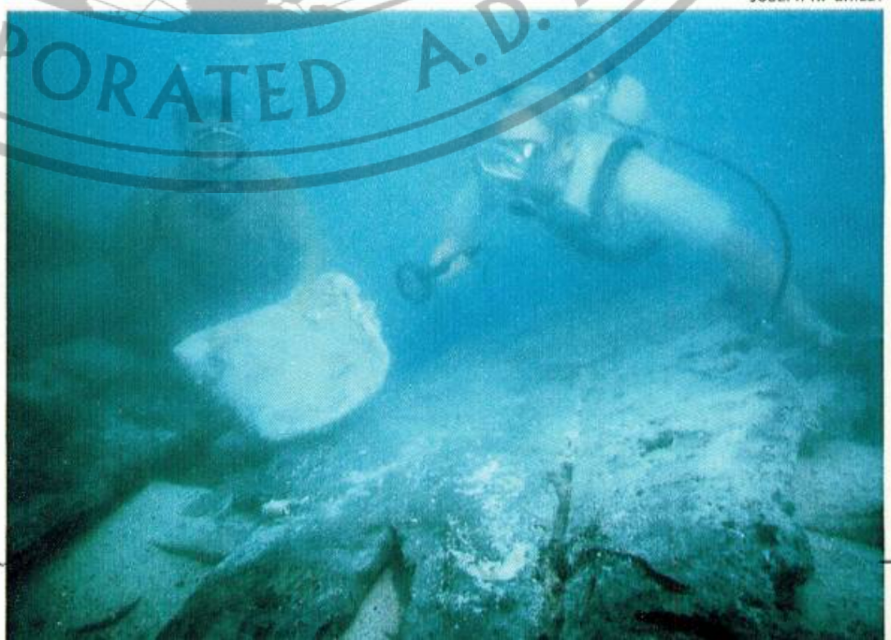
More important to us, however, was the evidence being brought up by diver Teddy Tucker from the wreck in Castle Harbour.

Tucker believed the ship to be the *Warwick*, which had been dashed against the cliffs late in November 1619, after bringing a new governor to the island. Most of the cargo had already been off-loaded, but a wide range of objects remained—including tobacco pipes. To me these were the real treasure. They were of the same shape and size as several found in the Wolstenholme fort well, suggesting that ours could easily have been in the fort before the Indians attacked in 1622.

Testimony of the sea



JOSEPH H. BAILEY



*TIME CAPSULE, but is it the correct one? Off Bermuda the author and diver Teddy Tucker study a piece of a caldron from a wreck (**right**), possibly the English Warwick sunk in 1619. Roman potsherds (**far right**) may have been scooped up with its ballast. Other artifacts are similar to the settlement's; thus, the wreck's identity is important in dating them.*

Sweden's Titanic, *the 200-foot Vasa was the pride of that nation's navy in 1628 when it sank on its maiden voyage from Stockholm. Raised in 1961, the ship drew the author* (**above,** *left) to confer with Dr. Hans Soop, a curator supervising the vessel's restoration.*

While the Vasa was settling to the bottom, colonists of Martin's Hundred who had survived the 1622 attack—as a handful did—were throwing out broken bottles. Fragments of them, found at the Suburb and another site, closely parallel a glass bottle found on the Vasa (**above left**). *The ship also contained buckles, thimbles, and other evidence to date similar Virginia artifacts.*

JOSEPH H. BAILEY

But was Tucker's wreck the *Warwick*? A few of the artifacts said "No," but most said "Maybe"—among them some of the least likely artifacts to be found on a 17th-century ship or in Bermudian waters at any date: five sherds of Roman pottery. An explanation was offered by clusters of ballast pebbles clinging to iron artifacts. I knew that coarse gravel from the Thames at London was often used for ships' ballast, gravel that even today is dredged up mixed with coins and potsherds from Roman Londinium.

I dived on the wreck myself, carefully removed a sample of ballast pebbles from the ship's planking, and sent it to the Geological Museum in London.

The Thames shore once was as familiar to me as the postholes of Wolstenholme Towne. Revealed at low tide were the discarded artifacts of 2,000 years of city life, everything from Roman jewelry to World War II incendiary bombs. Today, most of the metal objects have gone, salvaged by electronically guided treasure hunters. But the potsherds are still there, most of them dating from the Tudor and Stuart centuries.

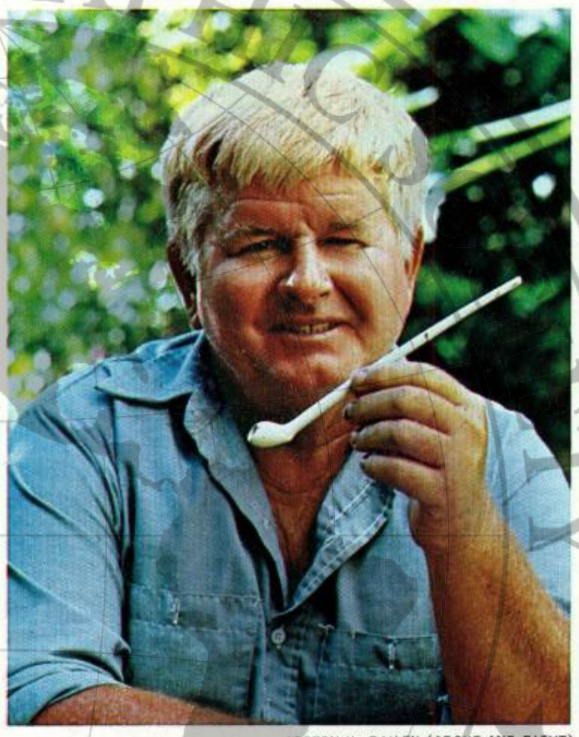
I was to learn to my chagrin that I was far more familiar with the river's pottery than with its gravel. On arriving at the Geological Museum for the verdict, I heard that although no staff member could say with certainty where my ballast sample originated, they were almost certain of one thing—it didn't come from the Thames. Thus the riddle of the Castle Harbour wreck and her Roman pottery has yet to be solved.

THE SAGA of Martin's Hundred and its far-flung research has been rich in surprises, not the least of them coming from a pit at the edge of our Wolstenholme Suburb: the bones of a left human leg, bent at the knee, lying on its side—apparently alone.

At once we recalled contemporary descriptions of the 1622 uprising, which told of the Indians "mangling the dead carkasses into many pieces, and carrying some parts away in derision, with base and bruitish triumph." Could this be a relic of such dismemberment? If so, why was the trophy left behind?

We studied early European engravings of alleged Indian atrocities and noted that our

Bermuda connections for pipes and pots



JOSEPH H. BAILEY (ABOVE AND RIGHT)

Sea Venture

"NO STRONGER than a nutshell" was the doomed vessel in The Tempest. The Sea Venture met a similar fate in 1609 and helped inspire Shakespeare's romantic play. Off Bermuda, the flagship of Sir George Somers struck a reef after a hurricane with a group of colonists en route to Jamestown, thus becoming one of the island's most famous wrecks.

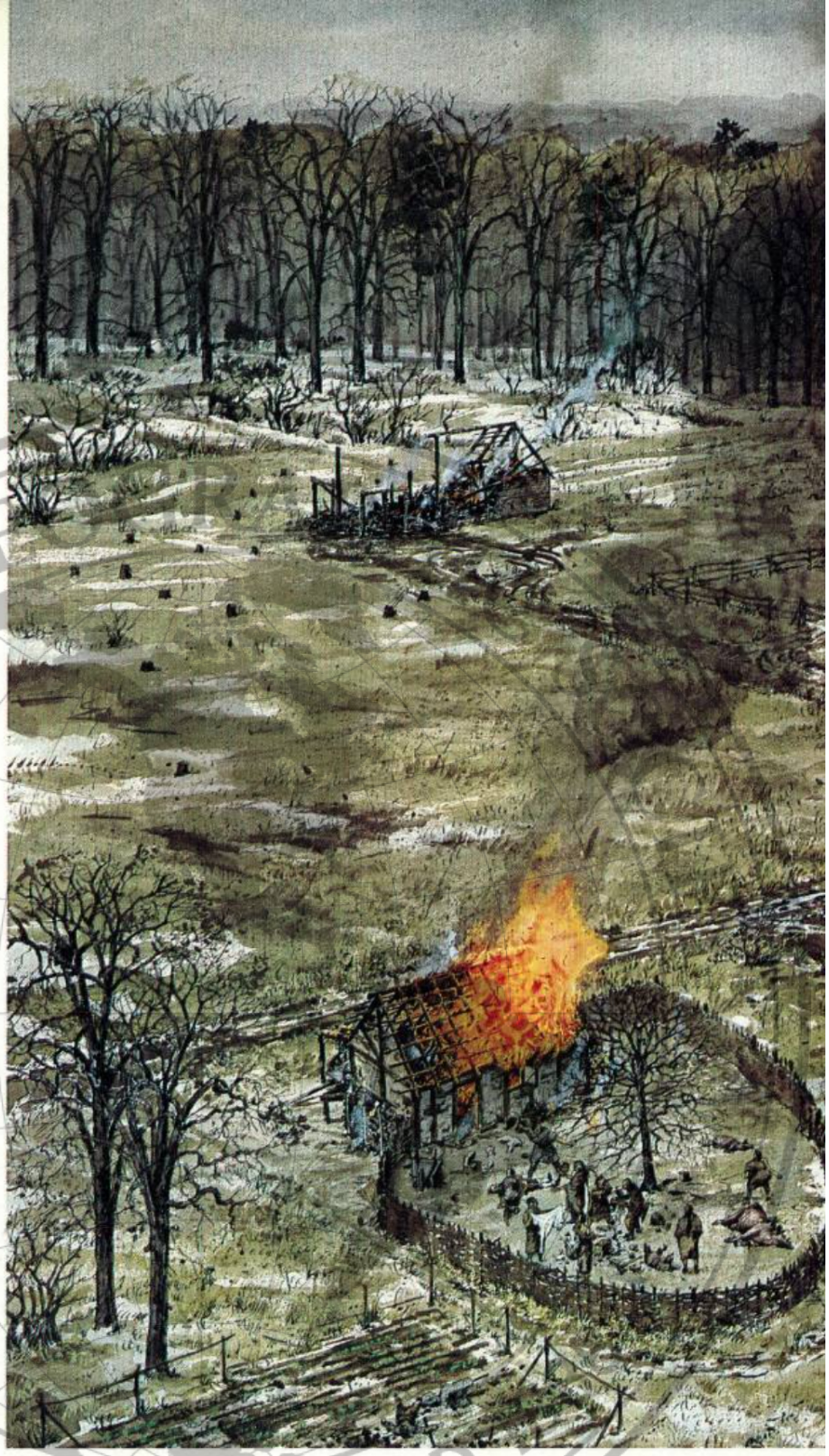
*Renewed excavations on the ship, discovered in 1958, have linked its cargo with similar goods brought by later settlers at Wolstenholme Towne. Earthenware jars (**left**) made in Devonshire in the west of England were probably taken aboard when the vessel stopped at Plymouth. They are studied by Audrey Noël Hume, historian for the Virginia project, and Allan J. Wingood, director of the Sea Venture research on behalf of the Bermuda Maritime Museum. The wreck's jars provided the earliest firm date of manufacture for similar pots (**below**) from Wolstenholme Towne.*

Castle Harbour wreck

PERILOUS REEFS around Bermuda are an archaeologist's dream. More than 300 shipwrecks hold an unrivaled store of artifacts. When firmly linked to a vessel known to have sunk in a particular year, they can be used to closely date similar objects found elsewhere.

*No one knows this vast undersea cross-referencing file better than veteran Bermuda diver Teddy Tucker (**above left**). He found this clay tobacco pipe along with many others in Castle Harbour in and around the hull of a ship that may be the Warwick, lost in 1619.*

*In size and shape Tucker's pipes match some of these (**left**) that turned up in a well within Wolstenholme Towne's fort. Initially, the Virginia investigators had been unable to date the fort's pipes as early as 1622, the year of the Indian attack and the town's presumed abandonment. But if Tucker's wreck is the Warwick, then such pipes were available to the settlers as early as 1619.*



*"**Treachery and cruelty** have done their worst to us," a colonist wrote of "that fatall Friday morning" of March 22, 1622. Smoke and ash billowed into the sky during simultaneous Indian attacks on more than a score of homesteads, including those of Martin's Hundred.*

Driven by "the dayly feare . . . that in time we . . . would dispossesse them of this Country," unarmed warriors had paid the colonists an ostensibly friendly visit. Seizing their hosts' own tools and weapons, the Indians struck, "so sodaine in their cruell execution, that few or none discerned the . . . blow that brought them to destruction." At Martin's Hundred, 78 deaths were reported. But about 20 of those people proved to have survived as hostages, and most of them were later released.

leg had not been chopped below the thigh as shown in the pictures. On the contrary, the femur was intact. Something, clearly, was wrong.

As so often happens in archaeology—more digging gave us the answer. Our leg was not alone. Just six inches below the left leg lay the right, and at that level we found the rest of the skeleton of a woman lying on her side, one arm up to her head and the other across her chest, fingers folded under, seemingly clenched.

My initial reaction was that the unfortunate woman had been thrown into the pit; but while she still lay in the cold December ground, I caught the flu and retired to bed—where, twice in the space of a single feverish morning, I awoke to find myself lying in the same position. I became convinced that hers was a posture of repose, and that her hand was not clenched but naturally folded, as mine was while I slept.

A call to Dr. Marcella F. Fierro, deputy chief medical examiner of Virginia, brought

welcome support. Our skeleton's position was consistent with death from exposure. In their last hours, Marcella explained, its victims often cease to feel cold; instead they drift first into a phase of relaxed contentment and thence into sleep.

We called our lady Granny because she had lost all her lower molars—though the tooth loss did not necessarily point to advanced age. In the opinion of Dr. Lawrence Angel, curator of physical anthropology at the Smithsonian Institution, Granny was between 35 and 45, a delicately boned woman about 5 feet 5 inches in height. Around her head was the ultimate surprise: an iron band with a pewter knob at one end and a twist at the other, the remains of a metal-cored fabric support over which Elizabethan women rolled their hair. It was a style popular between about 1590 and 1615. The band was twisted and bent back around the nape of her neck—as though roughly dragged away from her head.

What scenario could bring this matronly

CROWN COPYRIGHT, VICTORIA AND ALBERT MUSEUM, LONDON

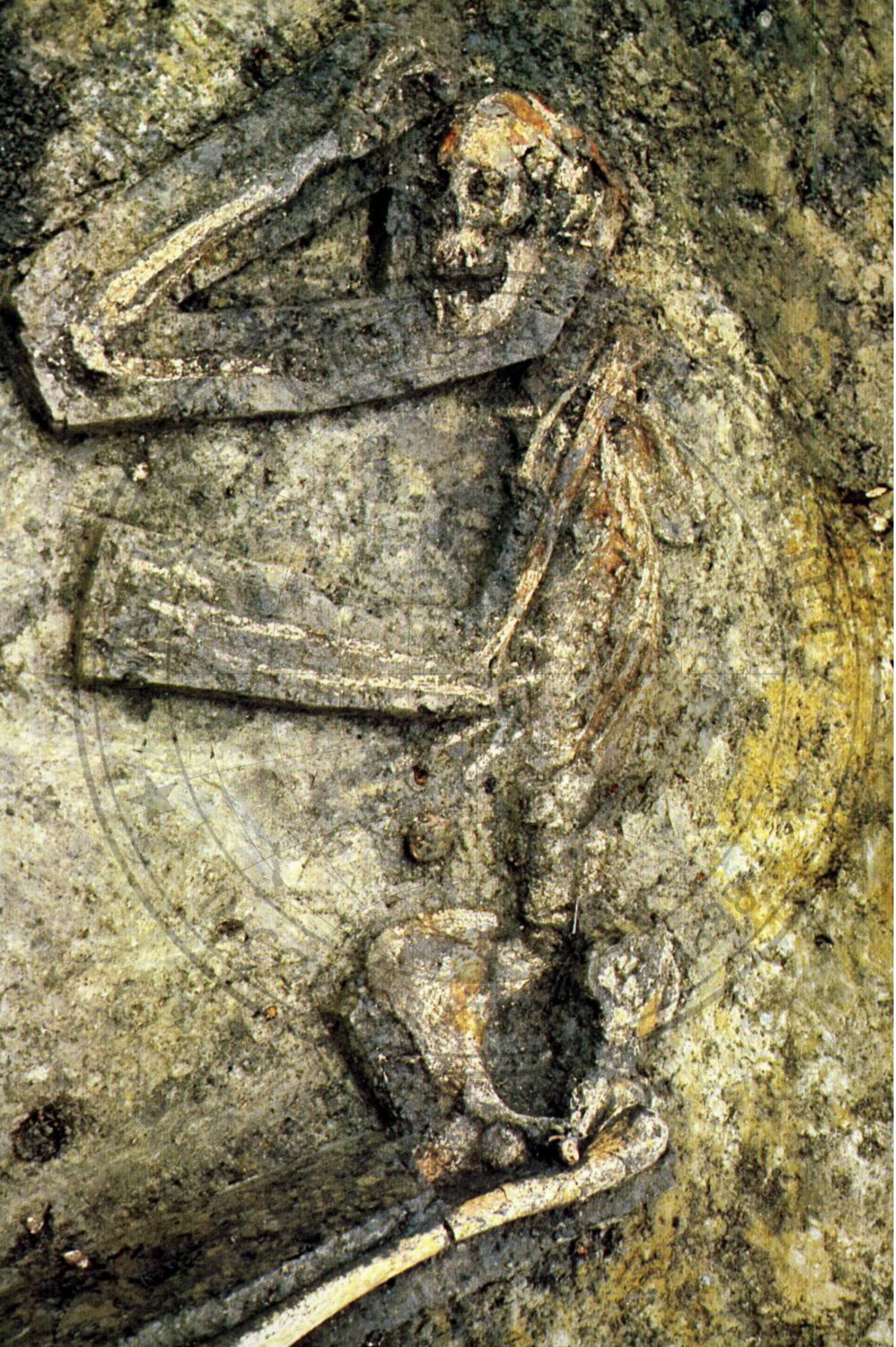
COLONIAL WILLIAMSBURG FOUNDATION (ABOVE, BELOW, AND RIGHT)

"We called her Granny"

*THUS NICKNAMED because she had lost all her lower molars, although probably about 40 years old, the woman had died a poignant death. Bit by bit, her remains (**right**) gave the archaeologists evidence of a cruel demise.*

She lay in a trash pit outside the homestead at the Suburb, a site replete with clues such as other skeletons, ashes, and part of a burned post ringed by scorched clay. At first only Granny's left leg was visible. Gently, the excavators probed deeper and finally uncovered the bones of a woman lying on her side, one arm to her head, the other across her chest, fingers folded. When the author became ill with a fever and awoke one morning in the same position, he reasoned that Granny might not have been thrown into the pit, as he first believed, but reached it under her own power and died in a sleeping position.

*But the real telltale evidence was wrapped around her head: the remnant of a metal-cored fabric support for a hairstyle popular among Elizabethan women. A Flemish engraving made about 1610 (**above left**) shows one such hair roll, elaborate and jeweled. Granny's had a pewter knob at one end, and was awry (**bottom left**). An X ray of her skull (**middle**) shows the hair roll as a white line. The pewter knob, lower right, is in place below her right ear. The rest of the roll should be in an arc over the top of her head. Instead, it has been bent back—as if yanked by a scalp-seeking Indian (page 52). Wounded, she may have crawled into the hole to hide, and drifted into an endless sleep.*



lady to her sleeping death in a half-filled trash pit?

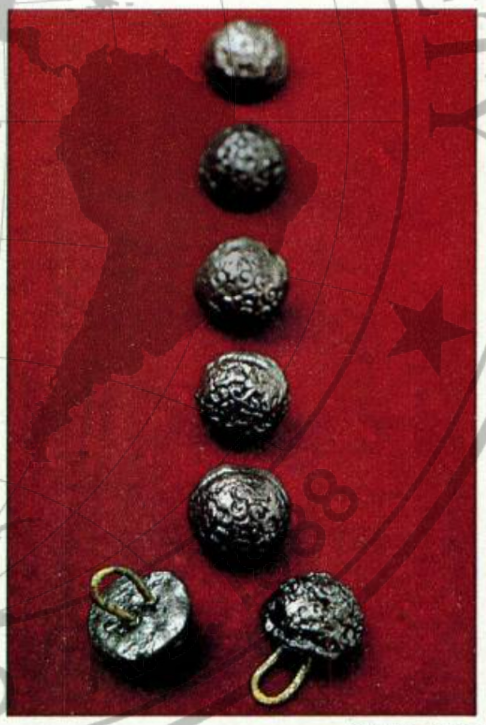
I remembered the apparent scalping scar on the first-found victim of the attack and tentatively concluded that Granny, too, had been deprived of a hair lock.

The burned remains of the house found at the Suburb, and the hastily buried dead outside its compound, left little doubt that once again we were in the midst of the massacre. The documents tell us that the attack was launched in the morning, in some instances by Indians who may have lodged overnight and who had sat down to breakfast with their intended victims—but not so early as to prevent Granny from doing her hair in the elaborate style fashionable in England in her youth. Clearly she was a lady who believed in maintaining her standards, even on what was to her the frontier of civilization.

When the disarmingly unarmed Indians seized shovels from their hosts' hearths and brands from their fires, the men of Martin's Hundred may have already been at work in their fields. Perhaps, we argued, only the women were left in Wolstenholme's palisaded Suburb: two, whose shallow graves were found, were struck down and killed; and Granny, who, left for dead, managed to crawl away amid the smoke and confusion. Escaping through a gate in the southwest corner of the palisade, and intending to make her way down the adjacent ravine to the beach, she changed her mind (perhaps because she heard Indians ahead of her on the shore) and hid in the open pit waiting for the looters to move on.

As dusk approached, Granny lay huddled against the side of the hole, weak from loss of blood, sheltering from a chill March wind, hoping that someone had survived and would come to save her. And there she died—so far from her homeland and the green fields and spires of Shakespeare's England, no one to pray for her soul or to lay her to rest. Instead, the hostile land claimed

BY IRA BLOCK AT THE HISTORICAL MUSEUM OF ROTTERDAM



JOSEPH H. BAILEY

Who lost the buttons *by Granny's house* ***(above)****? Not a woman but a man, says archaeologist Jan Baart* ***(left)****. The buttons match those on a bricklayer's jacket in a Rotterdam museum. By a quirk of history, it was worn by Dutch jurist Hugo Grotius after his prison escape of March 22, 1621—exactly one year before Wolstenholme's fiery end.*

National Geographic, January 1982

her; rainwater filled the pit; silt washed from its sides, and fast-growing weeds and grasses sprouted in the mud. Together they concealed her even from scavenging animals. She had chosen a hiding place so secure that it kept her safe for 357 years.

Finding three women and no separately buried men in the vicinity of the compound was in itself a surprise. Men, certainly, had been there, for pieces of weapons and armor were scattered through the pits. Recognizing relics of distaff life is always hard, for even kitchen equipment would have been used by men in the absence of women. At the same time, many a Virginia housewife would have taken a man's ax to split her own wood. Archaeologists therefore have difficulty recognizing a lady.

I HAD IDENTIFIED a group of nine small, rose-decorated metal buttons as coming from a man's doublet, but when I sent drawings to a costume expert at London's Victoria and Albert Museum, back came the suggestion that they had ornamented a woman's dress. My thinking turned to Granny in the Ground—Granny who dressed her hair as would befit a lady used to wearing a gown decorated with rose-embossed buttons. Was it not strange, I thought, that around her skeleton we had found not a single trace of clothing? Perhaps the grouping of the buttons south of the house was telling us where she was attacked, and offering another reason why, stripped and bleeding, she fled no farther than the pit.

Everything fitted, until, like Aesop's dog, I was undone by greed. Seeking confirmation that the buttons came from a woman's dress, I wrote to Jan Baart, city archaeologist for Amsterdam and an authority on 17th-century buttons. Back came a photograph of an original garment fitted with similar decorative buttons. But it wasn't a woman's dress; it was a man's doublet, and a bricklayer's doublet at that!

But how did Jan Baart know that it had belonged to a bricklayer?

In 1619 the religious dissident and lawyer, Huig de Groot, better known as Hugo Grotius and the author of the concepts of freedom of the seas and international law, was imprisoned in the fortress at Loevestein in the Netherlands. In time his guards allowed him to resume his writing, to which end books were brought in and out of the prison in a large wooden chest. On March 22, 1621, the books stayed and Grotius went. On reaching the home of a friend, he borrowed a bricklayer's clothes and tools, and thus disguised, he escaped to Antwerp.

Although Grotius had deftly unzipped my Granny's dress theory, his borrowed doublet provided an almost unbelievable piece of documentation: It proved that buttons like ours were in use in Europe just a year to the day before the Indians struck at Martin's Hundred.

We stopped digging two years ago, but in the laboratory treatment of the artifacts goes on, and the discoveries being made there can be as exciting and as unexpected as anything revealed by the archaeologist's trowel. Even as this article was on its way to the press, sharp-eyed conservator Hans Barlow discovered Martin's Hundred's most explicit message. Hidden in the fold of lead used to mount glass in lattice windows was stamped the inscription—*i ohn:Byshopp of Exceter Gonner 1625*—making the lead our earliest dated artifact. The most likely reading is "John Bishopp of Exeter, Gonner, 1625," although the interpretation of the last word is uncertain.

What did the message mean, and why was it concealed within the folded lead where no one would ever see it?

QUESTIONS like these keep us constantly on the alert. The names, the clues, the false leads, the missing witnesses, the bones of mutilated victims are all the stuff of detective fiction, but for us, the archaeological sleuths of Martin's Hundred, the mysteries are real.

One would like to claim that all our jigsaw-puzzle pieces have been fitted together through cleverness on our part. But it just isn't so. Chance has given us a wonderfully rich site, and luck has led us by the hand every step of the way. Without it, and incredibly hard work by dozens of excavators and research specialists, Martin's Hundred would still be a forgotten name on a damaged highway marker. Instead, Wolstenholme Towne is safely back on the map and into the pages of American history. □

The Amazing Frog-Eating Bat

ARTICLE AND PHOTOGRAPHS BY
MERLIN D. TUTTLE
CURATOR OF MAMMALS, MILWAUKEE PUBLIC MUSEUM

HUNDREDS of male frogs raised a deafening chorus in the jungle pond below. My interest, however, lay only partly with the amorous frogs. Through an infrared night-vision scope I watched in suspense for quite a different creature—a large bat.

Silently, several bats arrived at the pond, and instantly the frogs stopped calling. The bats hung in a bush for a few minutes, then left. As soon as the chorus resumed, back came the bats. This time they barely skimmed the ground, like fighter planes avoiding enemy radar. Suddenly one of the bats splashed hard against the water. When it came up, it held in its mouth an unfortunate frog (***right***).

I was ecstatic, little dreaming that before a week was out I would watch bats capture nearly a hundred more frogs in this one pond at the Smithsonian Institution's research station on Barro Colorado Island, Panama.

Two questions were obvious. How do bats find frogs? More important, how can they distinguish edible species from those that are poisonous, though similar in size

and shape and common at the same ponds? I speculated that hunting bats were using frog mating calls both to locate and to identify frogs. If this was true, then male frogs clearly were faced with a real dilemma—how to attract a mate and not a bat!

The National Geographic Society had agreed to support my research, and the project quickly aroused the curiosity of Michael J. Ryan, a frog behaviorist and Smithsonian fellow from Cornell University. Mike was studying the mating behavior of *túngara* or mud-puddle frogs *(Physalaemus pustulosus)* on Barro Colorado. It seemed only natural that we join forces to study the impact of bats on frog behavior.

Our enthusiasm grew rapidly as we found that the fringe-lipped bat, *Trachops cirrhosus* (we now generally refer to it as the frog-eating bat), was hunting frogs at every pond we investigated. At one small pond, occupied by some 250 mud-puddle frogs, we observed bats catching frogs at the rate of more than six an hour.

Crooning Frogs Court Disaster

As I watched with the night-vision scope, I confirmed my hypothesis that the bats' hunting success is dependent on frog calling. If the frogs quit calling as soon as a bat arrives, they are safe. Often the hunters pass unwittingly within inches of silent frogs. However, a single faint call, made as a bat approaches, may cost a frog its life.

Most bats' hearing is adapted primarily for high-frequency, mostly ultrasonic, signals used in their own echolocation. However, our auditory experiments have shown that frog-eating bats have a secondary peak of hearing sensitivity at low frequencies—below five kilohertz—a capability never before reported among bat species. This is exactly the frequency range in which most local frogs call the loudest, permitting the bats to hear them over long distances.

We soon learned that we could catch frog-eating bats by playing tape recordings of frog calls beneath fine-threaded mist nets. Frog-eating bats could hear our recorded calls from a distance, and when few real frogs were calling, we often caught a bat in less than a minute.

There was much suspense the first time we tested one of our captured bats in a large outdoor flight cage. We had spent most of the previous night calming the creature and getting it used to its new surroundings. Now we herded it into the far corner of the cage and retreated to our tape recorders in the opposite corner. In the two remaining corners we had hidden speakers, ready to play calls of edible versus poisonous frogs.

Would the bat be able to identify the calls, or would it merely respond to any froglike sound? We could hardly contain our excitement when the bat immediately flew to the speaker playing the call of the edible frog. It landed and tried to pry its way through the screen covering of our speaker box.

For a second trial we switched the speaker wires, so that the two calls would play from opposite corners. Again, the bat responded at once, flying to the new location of the edible frog's call. After many such successes, we knew we were on to a thrilling aspect of frog/bat behavior.

With further tests we determined that our bats could also distinguish between the calls of frogs of edible size and those that are too large to eat. Then, using the same methods, we tested our bats' preferences for species of poisonous toads versus edible frogs that they could not have heard before. The bats continued to make correct choices.

Among New World frogs, the toad species form a closely related group. They share certain subtle similarities in their otherwise distinctive calls. We now suspect that the frog-eating bats, which live in tropical forests from Mexico to southern Brazil, are genetically programmed to recognize these subtleties.

The discovery that frog-eating bats would respond to frog-call recordings, played on micro-cassette tape recorders, enabled us to verify many of our findings in the wild. We set two small tape recorders on the ground about 12 feet apart, where they could be viewed through the night-vision scope. One greedy bat sat in a nearby bush and chased other frog-eating bats away for a time before it came down and discovered that it was guarding some new kind of armor-plated frog! If bats communicate about such things, there must have been some wild tales told by the many frustrated bats that found our speakers.

Our discovery that bats rarely catch silent

frogs suggested several ways in which frogs might manage to survive: They can stop calling, call less often, call less loudly, use call types that are difficult to locate, or hide well before calling. Unfortunately for the frogs, each of these options would reduce the odds of attracting a mate.

To evaluate these options, we tested many bats, both in our flight cage and in the field. They were as sophisticated as we suspected. They chose call recordings played slightly louder or at higher repetition rates, and preferred the more complex calls, which seem to be most easily located.

Risky Call Is Females' Choice

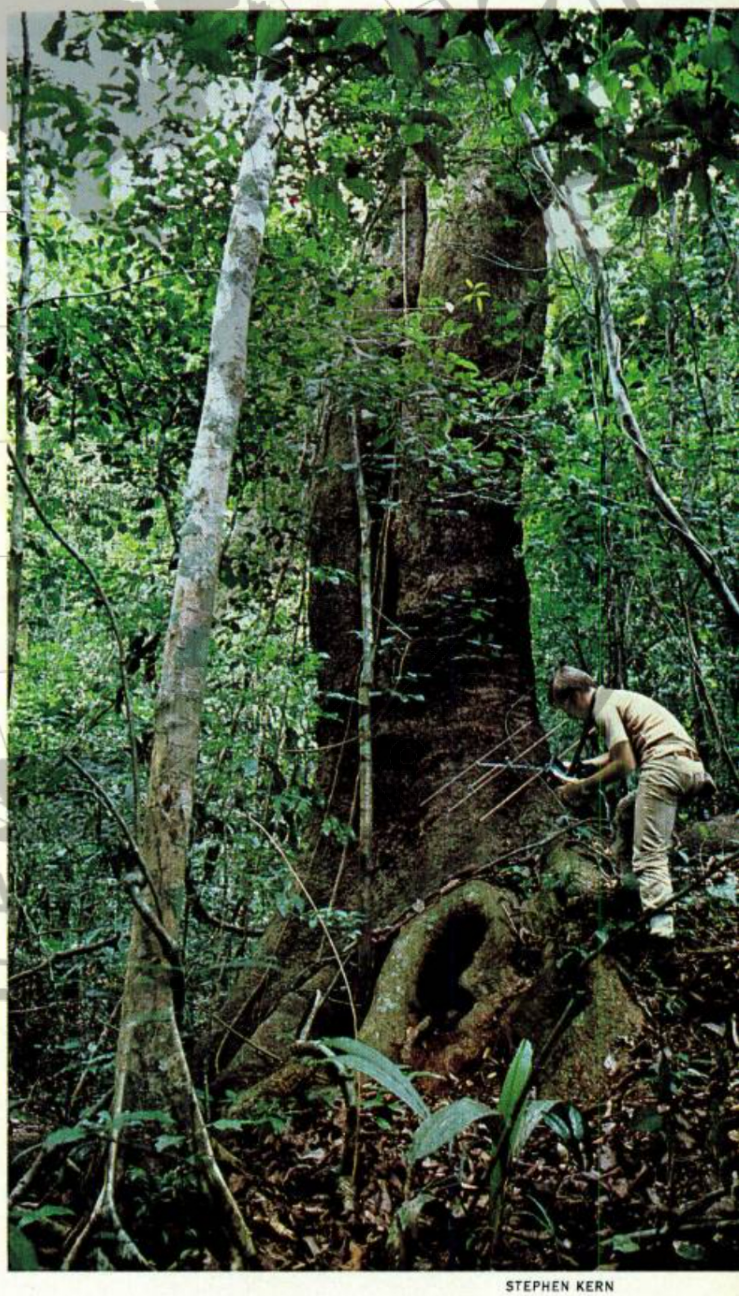
Herpetologists have long questioned why male frogs sometimes behave rather unexpectedly when trying to call mates. For example, 16 years ago Smithsonian herpetologist Stanley Rand noted that male mud-puddle frogs on Barro Colorado Island use two kinds of call but, inexplicably, are often reluctant to use the one preferred by females. The males' complex call, a whine with several chucks at the end, seems the most easily locatable and is most attractive to females. It is mainly used under relatively safe conditions when many other frogs are close. If a frog is alone, only a simple whine call is used, often less frequently or loudly than usual. Dr. Rand postulated the existence of an unknown predator that perhaps also preferred the most easily locatable call.

Mike and I were convinced we had found the predator. To test Dr. Rand's hypothesis, we simultaneously presented our bats with simple and complex frog calls. Again, we were delighted when both caged and wild bats responded more often to the complex call. We were especially happy that Dr. Rand was present to share in our discovery.

Since the early 1900s biologists had speculated that the response of predators to particular calls might have played a major role in the evolution of vocal communication, but this was the first experiment to document clearly the effects of such selection on vertebrate behavior. We increasingly began to realize that, as unlikely as it might seem, bats have had major impact on the behavior of male frogs, perhaps nearly as much as the female frogs themselves.

My observations at the frog ponds had

Flying by night, *bats that eat frogs haunt forests from Mexico to southern Brazil. In Panama the author affixed small radio transmitters to bats, then tracked them to their roost in the base of a tree* ***(below)****.*



STEPHEN KERN

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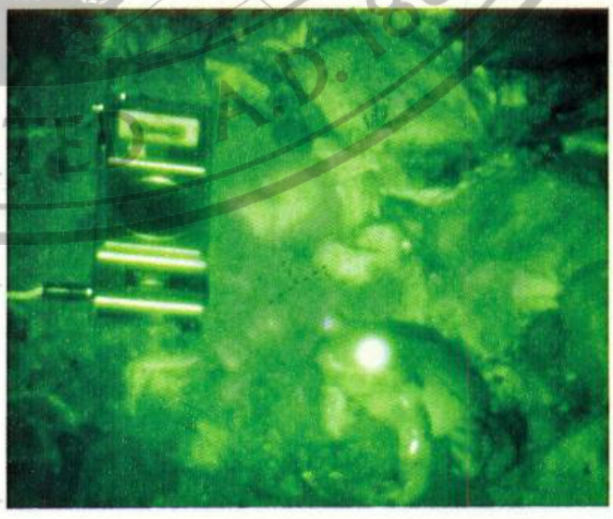


Fast-fading twilight *finds the author* ***(above)*** *using a night-vision scope to view tape recorders that play frog mating calls. His discovery: Bats home in on the calls of edible frogs and avoid those of the inedible varieties.*

A large bullfrog ***(right)*** *approaches a recorder that broadcasts a mating call in his territory. The frog jumped on the recorder, which continued playing. The startled frog fled.*

indicated that frogs might be doing much more than varying their calls to avoid bats. On certain nights mud-puddle frogs seemingly had detected approaching bats and quit calling, yet on other nights they were apparently oblivious. Could frogs actually detect bats, and if so, how, and why only on some nights?

To test frog abilities, I constructed several model bats. They were cut out of cardboard along outline tracings of real bats, stained the approximate color of the bats, waxed to be water resistant, weighted below, and equipped with rollers above. By varying the slope of a fishline, we could run them over the frog pond at about the normal speed of a frog-eating bat.

The next evening we waited with considerable excitement as the frogs began calling and a model frog-eating bat was remotely released for its flight over the pond. The frogs' response was unmistakable: The raucous chorus changed suddenly to total silence.

Repeated trials with model bats on dark and moonlit nights answered our questions. Frogs detect bats visually. On all but the darkest nights frogs stop calling at once when a model frog-eating bat arrives at the edge of their pond. On moonless, cloudy nights frogs cannot see the models. Furthermore, when tested with models of harmless insect-eating bats, which are smaller, the frogs either do not respond at all or resume calling more than three times faster than when frightened by a frog-eating bat model.

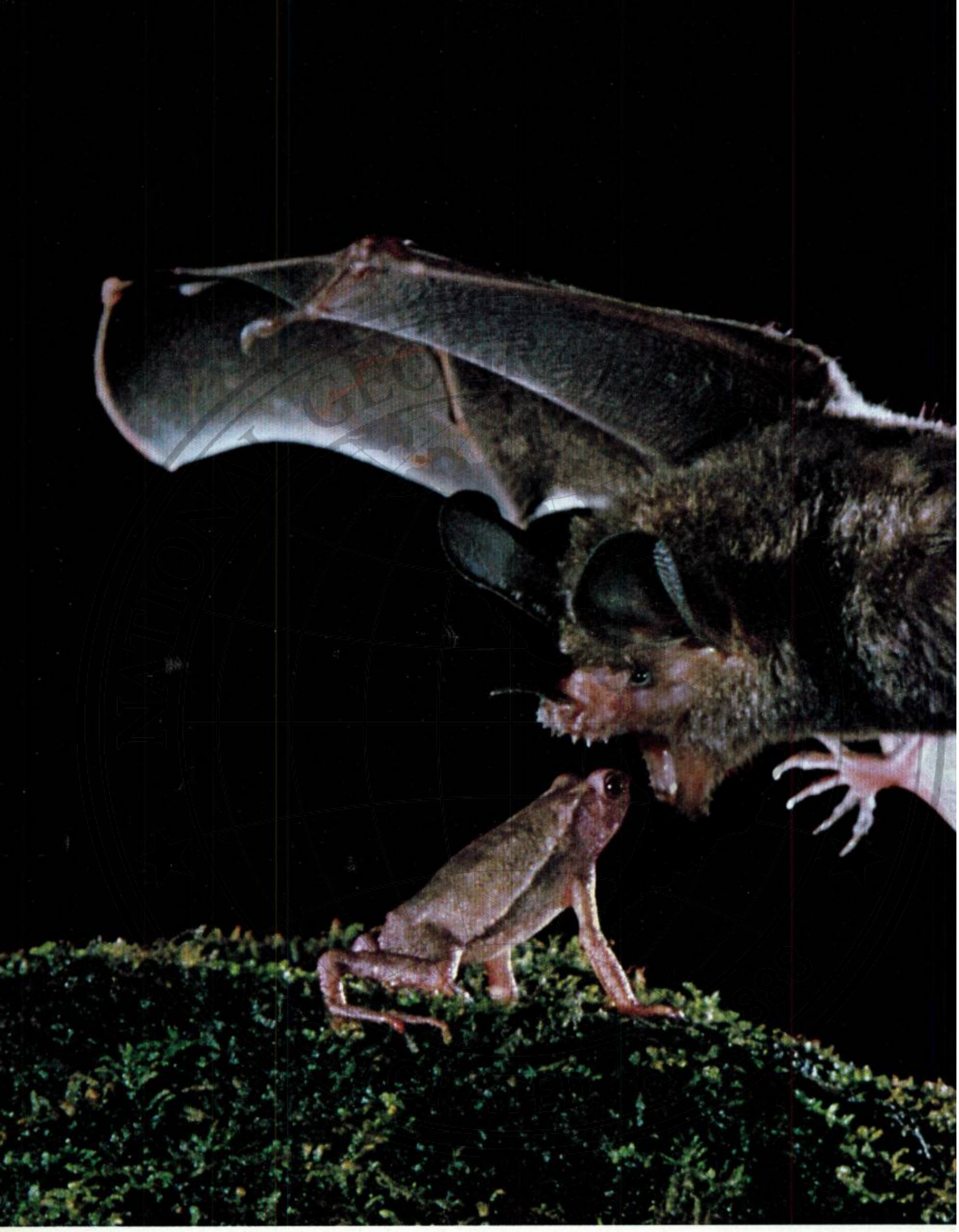
The ability of frogs to detect hunting bats and to distinguish dangerous from harmless kinds enables them to vary behavior according to threat. This greatly reduces danger when frog-eating bats are present and permits frogs to call more attractively to potential mates when the bats are not present.

Apparently only a few very large or poisonous frogs can afford to ignore bats. On Barro Colorado Island both bullfrogs and toads can. They call loud and long and from

"I asked for it," *said the author after being nipped by a bat he had trained* ***(left)****. "I was trying to discover the animal's close-range technique for pinpointing prey. Is it through the sounds the prey makes, or does the bat rely on its sonar?"*

For his experiment, Dr. Tuttle held a small, quiet frog in his right hand while rubbing two fingers together. Here, landing on his hand, the bat goes for the rasping fingers. Another homes in ***(lower left)*** *on a recording of a frog's mating call.*

"Bats do not normally attack people," explains Dr. Tuttle. "In 23 years of working with bats I've always found them gentle, never aggressive."



Swooping down on a poisonous toad *in the black of night, a frog-eating bat apparently avoids trouble through the use of special equipment—small bumpy protrusions around its mouth called dermal denticles, "skin teeth" that may sense the toad's poison and warn the bat of peril. This trained bat, tricked into*

attacking a silent toad, was unable at first to distinguish it from an edible frog. Upon contact with the toad, however, the bat backed off, leaving both unscathed. The author, an experienced falconer, kept such tame bats in a large cage and taught them to attack prey on his own vocal commands—a series of chirps.

conspicuous locations, and do not stop even when frog-eating bats pass within inches. In contrast, we have not found any edible species that calls so carelessly. Some edible frogs call frequently and loudly, but they call either from concealment or from perches protected by thorns.

The pug-nosed tree frog *(Smilisca sila)* exhibits an especially interesting array of strategies. This frog remains quiet on dark nights. At low light levels it spaces its calls widely and uses only simple calls that are hard to locate. On bright, full-moon nights, it perches conspicuously on top of rocks, uses easily locatable calls, and apparently ducks under a leaf or dives into the stream when threatened. These frogs also reduce danger of predation by calling in highly synchronized duets, trios, or quartets, and by calling near waterfalls. The fact that they are territorial, and never gather in large choruses, perhaps explains their need for a greater range of bat-avoidance behavior.

Suitor Tries to Bully Rival

From the beginning, there was rarely a dull moment while studying interactions between bats and frogs. My field assistants, Steve Kern and Cindy Taft, often teased me about sounding more like a basketball announcer than a scientist when I recorded my field observations on tape. It was, of course, exciting simply to watch the bats hunting and catching frogs practically at my feet. But more than that, we never knew what to expect from any of them.

One night while field-testing bat choices of recorded calls of the South American bullfrog *(Leptodactylus pentadactylus)* versus the mud-puddle frog, I heard the call of a real bullfrog. This large frog is territorial and highly intolerant of other males calling in its domain. My tape-recorder was in his territory. As he slowly hopped closer, he repeatedly varied his call, apparently trying to get some response. Finally he came very close and called as loudly as possible. When that failed, he jumped on the speaker. As the call continued, he fled in giant leaps, not to be seen again that night!

The bats themselves were often a source of amusement. Newly caught bats had to be tamed so they would not be disturbed by our presence in the cage during testing. We would spend hours of patient coaxing, late into a bat's first night of captivity, training it to accept food from our hands. Some bats learned so rapidly that by the second night they preferred to follow us around the cage instead of responding to our experiments.

With Patient Coaching, a Star Is Born

At first we tamed bats only so we could get them to behave normally during experiments. Then our knowledge that frog-eating bats could be trained and even called to our hands was put to an entirely new use. I wanted to photograph many of the fascinating things I had observed, but it seemed impossible that I could anticipate exactly where the next frog would be caught or from which direction a bat would come.

After many nights I finally succeeded in training a bat to catch frogs left sitting on a rock on a table. I rigged a small infrared beam just over a frog's head, turned out the lights, and waited. Anything that would break the infrared beam would trigger a picture. Moments later there was a blinding flash of light, and I had a picture of an escaping frog! Then, to my dismay, the bat beat me to the frog and ate it before I could retrieve it. Now the bat wasn't even hungry.

Undaunted, I waited till the bat again showed signs of hunger and placed a new frog on the rock. This time I was delighted to get a picture of the bat catching a frog, even if it did show only the bat's backside.

Eventually I would take nearly 50 pictures in an hour, in bright light, using highly trained bats that would not come till called, and that would then come exactly where I wanted them. I could place a frog almost anywhere, point to it once, and expect that my trained bat would come and catch it immediately when I signaled.

Huddling for warmth, *bats embrace one another with their wings in a roost inside a hollow tree. Three females, one yawning, compose the harem of the wary-eyed male at bottom. Leaflike tips of their noses help aim the high-frequency sounds of their sonar. Sharp prongs in their ears aid in receiving the echoes.*

The frog's dilemma: *Chirp for a mate, and you may get zapped by a bat* ***(above)****. A pug-nosed tree frog* ***(near left)*** *copes with the threat by protecting his rear with a leaf, singing only on moonlit nights when he can spot prowling bats, or chirping near waterfalls whose random noises probably interfere with the bats' hearing.*

For a mud-puddle frog ***(center left)*** *there's some safety in numbers. These frogs will join with hundreds of others at a pond in a sort of Russian bat roulette where some get eaten but others find mates.*

Eyeball to eyeball, a mud-puddle frog ***(far left,*** *at left) sits with a poisonous toad.*

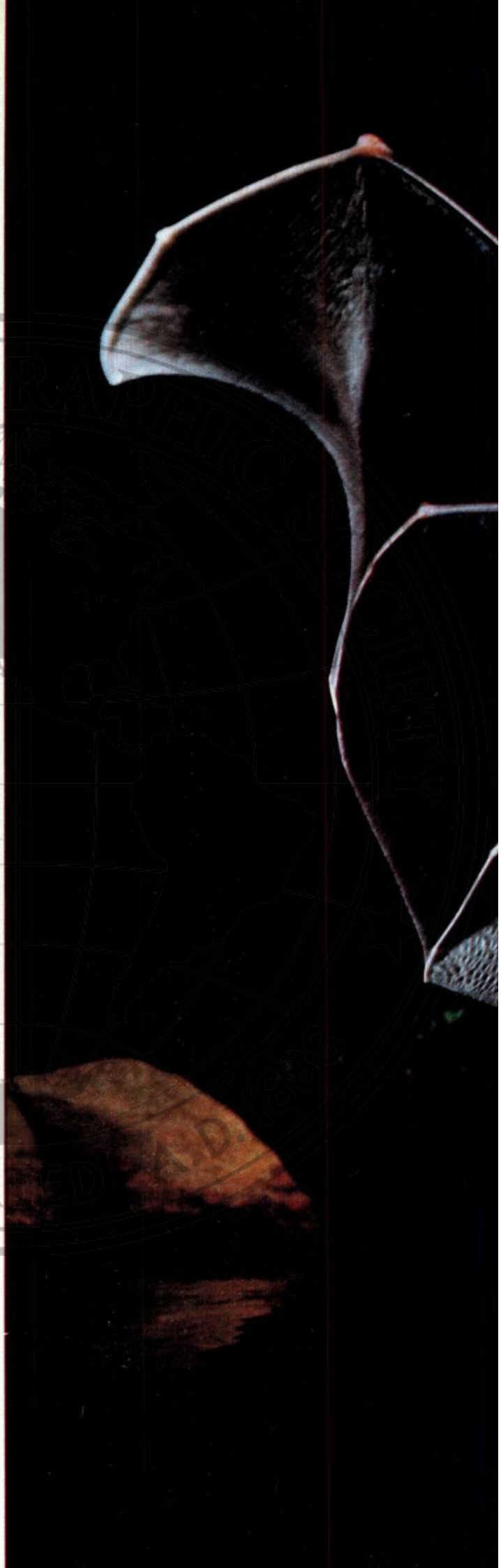
One bat in particular became my star performer. He would step onto my hand anytime, would fly to my hand whenever I called, and seemed to know when to expect a reward for a good performance. Without his consistent cooperation, many of the pictures on these pages would not have been possible. Having enjoyed such a privileged relationship, I find it hard not to be sentimental about these remarkable creatures.

Simply because bats are nocturnal and timid, most people misunderstand, fear, and persecute them. Many species face possible extinction unless these misguided attitudes are reversed.

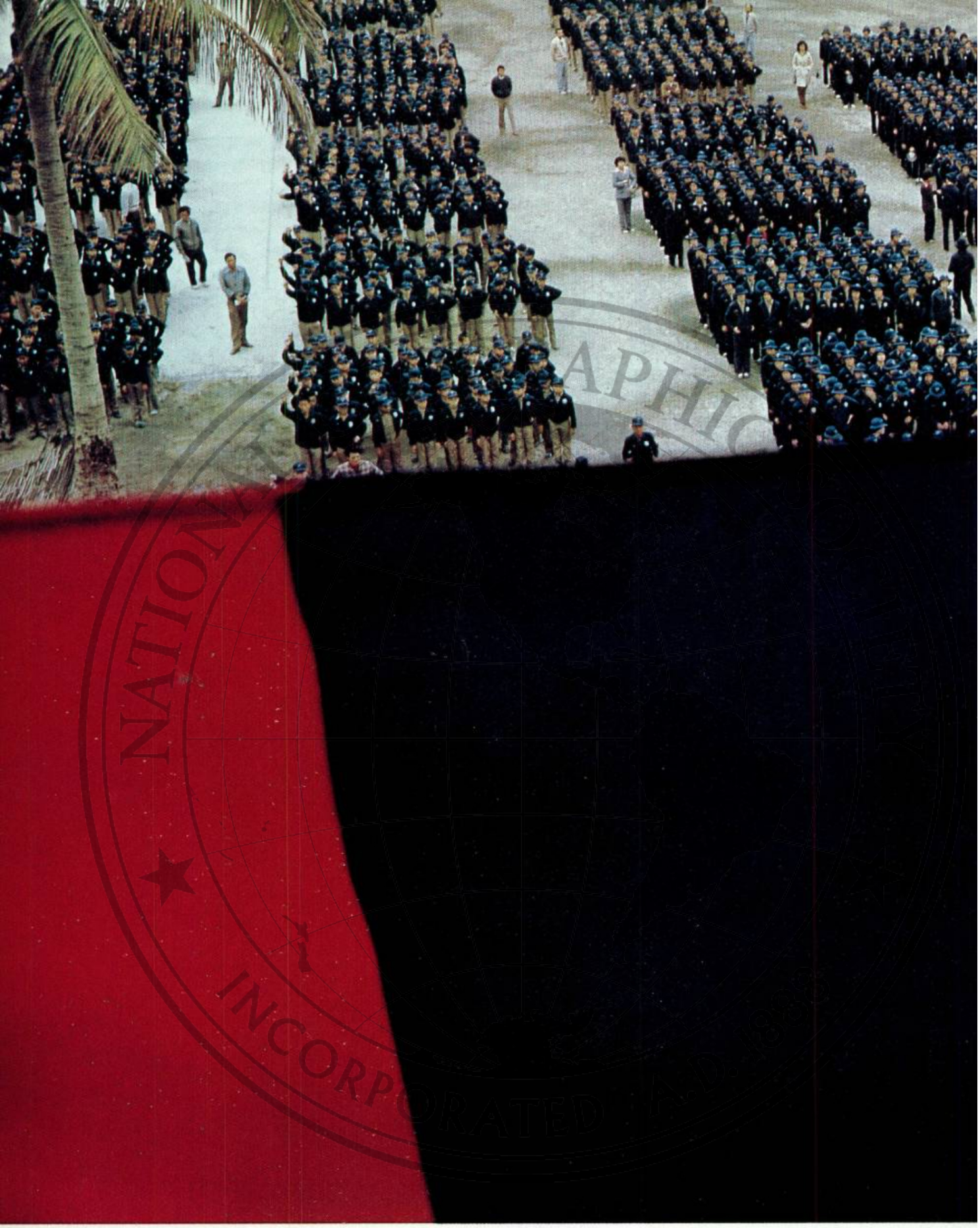
Over the years I have gained numerous new insights into the lives and behavior of bats. They are highly respected and very much liked by those of us who know them. Despite myths to the contrary, they are not blind, they carefully groom themselves, they rarely transmit diseases or parasites to man, and they do not become entangled in people's hair. They are rarely rabid, and even then are seldom aggressive. When people are bitten, it is usually because they have picked up a sick individual that bites in self-defense. Bats found where they can be picked up should be assumed to be sick and left alone.

Most bats are highly beneficial. Tropical bats probably were the original pollinators or seed dispersers for a wide variety of economically important fruits and spices such as bananas, avocados, mangoes, guavas, breadfruit, pepper, and cloves. Bats also consume countless millions of insects nightly, including such pests as mosquitoes.

As our studies of interactions between bats and frogs illustrate, there is a great deal more to be learned about these sophisticated creatures and how they interact in the world around us. Certainly such exciting animals deserve much more respect and consideration. □



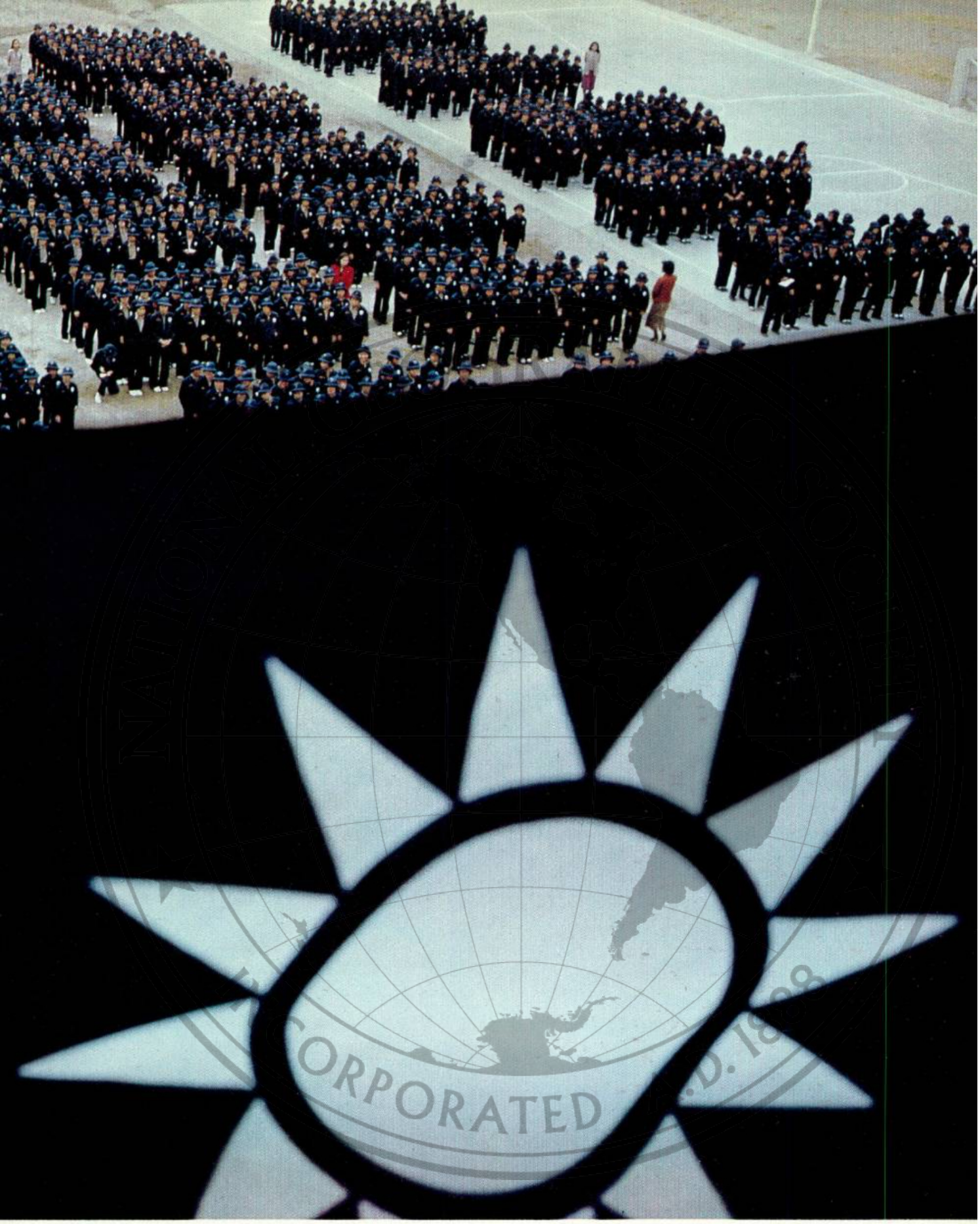
Dip and sip. *For safety's sake, to avoid such predators as owls and opossums, a frog-eating bat drinks on the wing. To take this remarkable photograph, the author spent many midnight vigils waiting for his charges to make their eye-blink swoops.*



Born in the defeat of civil war, united by diplomatic isolation, Taiwan survives on economic stamina and patriotic zeal. Uniformed students in Kaohsiung begin the day with their national anthem.

By NOEL GROVE
NATIONAL GEOGRAPHIC SENIOR WRITER

Photographs by
JOHN CHAO



TAIWAN

TWO WERE TALKATIVE, one was shy, one was brooding and silent. The four young men, engineering students on a holiday, seemed to represent a cross section of campus personalities: ambitious, uncertain, rebellious. In philosophy and purpose, I found, they were as like as four peas in a stir-fry pod.

I asked about the writing carved into a marble slab near Taiwan's Taroko Gorge, where sheer cliffs tower hundreds of feet above a swift river. The message dated from the Sung Dynasty (A.D. 960-1280) and was written in classical Chinese.

The writer, Wen Tien-hsiang, had been imprisoned on the mainland by Mongols during one of China's fratricidal wars, said the students. He had refused to cooperate with his captors despite promises of freedom. Doomed, he reflected on his fate, in words as grandiloquent as the setting in which they were now placed:

"There is in the universe an *Aura* which permeates all things and makes them what they are. . . . In man it is called spirit; and there is nowhere where it is not. . . . Only at some great crisis is it manifested widely abroad."

Brave, colorful words, I observed to my eager committee. And does such spirit still exist? And do the times still demand it?

Two turned thumbs up in the gesture of approval. "The words have as much meaning now as they did then," said one. The shy one nodded agreement.

I inquired about their future, and they replied that after study in the United States, they would return home. "Our country needs us," added the brooding one.

Nationalist Tenacity Surprised Many

If trouble brings forth strong people, Taiwan's perpetual crisis has proved a blessing. Born in defeat, threatened by invasion, now "derecognized" as a nation by most of the world, the little island state has not only survived, it has also flourished.

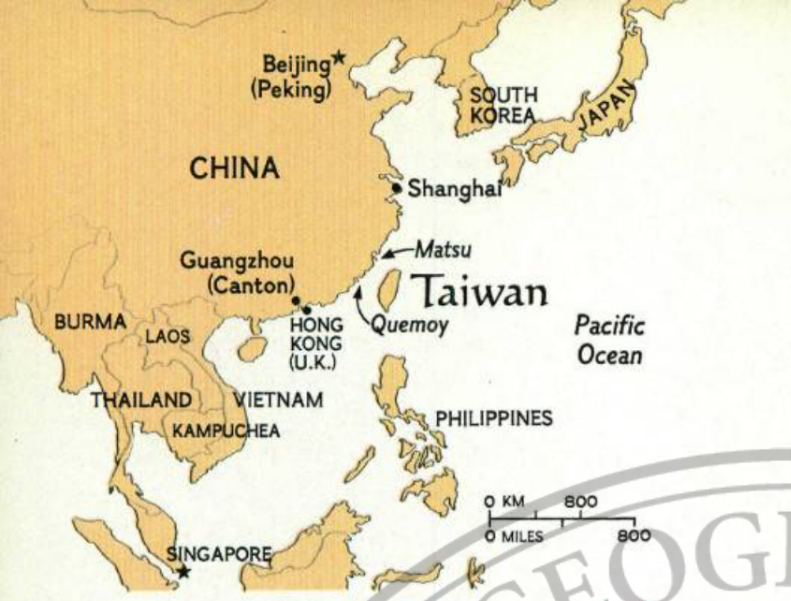
When the army and government of Nationalist leader Chiang Kai-shek retreated to the island just a hundred miles off the Chinese mainland in 1949, most of the world believed they would be overrun by the Communist forces that drove them there. Other

Fervor explodes *as pilgrims converge on the port of Peikang for the birthday of Matsu, goddess of the sea. Masked against firecracker smoke, celebrants*

bear replicas of the deity—introduced from Fukien Province in the 17th century by ancestors of Taiwanese, as pre-1949 residents are called. The most recent immigrants, called mainlanders, are the two million Nationalist Chinese who, defeated by Communist armies in 1949, fled to the island province.

As paychecks swell, *so does traffic in Taiwan's crowded and burgeoning cities. In Taipei, the capital city of 2.25 million people, the movie district's narrow streets are clogged at late afternoon with recently acquired automobiles—*

universal symbols of prosperity. Already boasting one of Asia's highest living standards, Taiwan's 18 million people expect to join ranks with the world's most highly developed nations by the end of this decade.



A province, not a country: *On this definition of the island, all agree. But the Nationalists, who ruled the mainland for 38 years, still see themselves as the legitimate leaders of all China—despite their government's derecognition by the United Nations in 1971. The People's Republic of China, promising Taiwan economic autonomy, recently stepped up its diplomatic drive for reunification. These proposals are routinely rejected by the Nationalists.*

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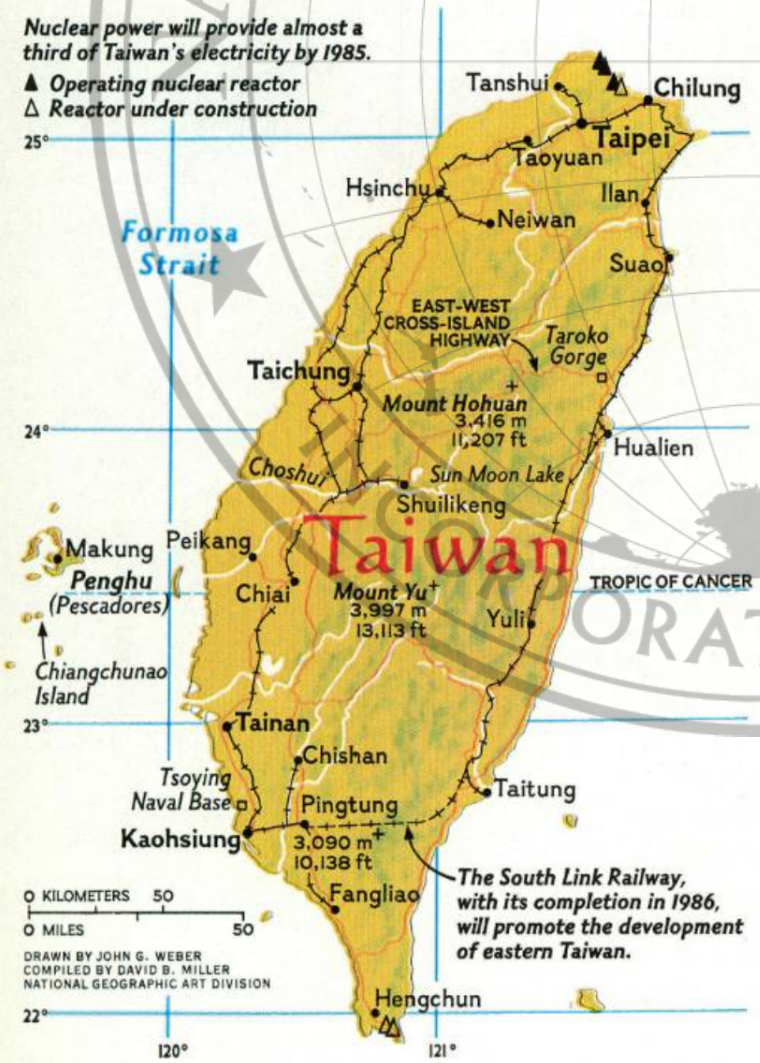


Chinese agreed and fled to Macao, Hong Kong, and the United States. The dedicated and desperate began to build a last-ditch fortress on Taiwan, with a headquarters-in-exile in Taipei, the largest city.

Those two million mainlanders shared the island with ethnic Chinese whose ancestors arrived in earlier migrations, as well as some 200,000 aboriginals, many of Malayan stock. Today the island population is about 18 million, but the term Taiwanese is reserved for those who occupied Taiwan before the postwar influx.

The Nationalist influx was a chance for renewal in a new setting. The defeated government would continue to be based on the principles of Dr. Sun Yat-sen, whose 1911 revolution began melding provincial warlords into one republic of China. Political power would be in the hands of the Kuomintang (KMT), the main political party. The strong-willed Chiang Kai-shek was head of the party and president of the government until his death in 1975. His son, Chiang Ching-kuo—considered a more personable head of state—succeeded his father as party chairman and in 1978 was also elected president.

Democratic in form, the government is authoritarian in substance. Citing a constant threat from the Communists, it has ruled for more than three decades with many of the strictures of martial law.

Taiwan, envisioned the exiles, would become a model China while they waited for the right moment to return to the mainland. It has been a long wait and a return is nowhere in sight, nor is one much discussed except in hollow-sounding sloganry. It is as if the government in Washington, D. C., fled to Puerto Rico, corrected past mistakes, and created a booming island that, in many respects, outshone what it left behind.

Economy Belies Taiwan's Size

Taipei, Taiwan's capital, is a city of 2.25 million people with wide avenues and tall office buildings. Annual per capita income stands at $2,100 (U. S.). In all Asia only Japan, Hong Kong, and Singapore rank higher. Taiwan has become an exporter whose products circle the globe. In 1981 the government held 5.3 billion dollars in foreign currency and wondered how best to use it.

National Geographic, January 1982

The record would be impressive even for a large industrialized nation rich in natural resources. But the island is 240 miles long and from 60 to 90 miles wide—about as big as Connecticut, Massachusetts, and Rhode Island together. The soil is fertile, but only a fourth of it can be worked because of steep, forested mountains.

Isolation and the constant sense of military emergency have sustained a patriotic fervor such as that shown by the students at Taroko Gorge. External threats were more real in the 1950s, when the Communists assaulted offshore islands between Taiwan and the mainland. The Nationalists responded with night raids across Formosa Strait. Fighting was eventually reduced to artillery shelling, but even that has been silent for several years.

The end of conflict did not mean the end of preparedness. To keep their troops combat ready, Taiwan holds dangerously realistic military maneuvers. A former soldier told me that infantrymen in mock wars fire plastic bullets that can be fatal under 100 feet, painful at longer distance.

Quemoy, largest of the offshore islands, is probably the most heavily fortified piece of real estate in the world. Perhaps a fourth of Taiwan's half-million-man military is located there and on nearby Matsu.

I arrived on Quemoy aboard a C-119 transport plane, expecting to see an island bristling with defenses. Pregnant would be a better word. The vast bulk of weapons and troops are located underground, nestled in the belly of the 9-by-11-mile island, some under dozens of feet of solid granite.

I walked through cool tunnels with side passages to "spider holes"—trapdoors that riflemen could open quickly to fire on invaders before closing them again. Tanks, airplanes, even gunboats stand ready to boil out of secret passages like hornets from a stirred-up nest. Nearly hidden in a ravine is the entrance to a 300-bed hospital, said to be the first ever built into solid rock.

In the eighties, the battleground may be more economic than military, and the Chinese on Taiwan feel they are winning. They are aware that the Communist People's Republic of China, struggling with its own modernization program, has thrown envious glances across the strait. Both sides claim to be the rightful government of all China, of which Taiwan is only a province. The people of Taiwan claim that economic might makes them right, and that their system will eventually prevail.

"Think of Taiwan as a symbol of a certain life-style," I was told in Taipei by a dapper international lawyer, Paul Hsu. "We have proof that we have a working system, one that other countries—including some in Eastern Europe—would like to imitate."

That life-style is reflected in the confident plunge into modern living, with regular paychecks and plenty to eat. In the most remote villages color television sets blare from the open shops and aerials sprout from farmhouse roofs. In the cities, motorized scooters and cycles swarm like gnats around ever increasing automobile traffic. Men wear silk shirts and Swiss watches. Women go on diets and squeeze into tight jeans.

The Shock and Anger of Derecognition

But crisis has continued, perhaps fortunately for the little non-nation. In 1971 the Republic of China (ROC) lost its seat in the United Nations to the People's Republic of China, and 40 nations subsequently switched recognition to the Beijing (Peking) government. At this writing, only 22 countries still recognize the ROC on Taiwan as the real China.

The biggest blow of derecognition came in December of 1978, when President Chiang Ching-kuo was awakened at 2 a.m. for a meeting with the U. S. ambassador. For the first time in history, the United States announced it was severing relations with a friendly country.

Shortly thereafter the United States Congress passed the Taiwan Relations Act, which promised support for the island. But the Mutual Defense Treaty that had protected Taiwan and buoyed her economy for a quarter of a century was allowed to expire January 1, 1980.

A farmer near the southern port city of Kaohsiung wagged his finger at me with a smile: "We were angry with you Americans and cannot completely forgive you. Before, when things went badly, we would think, well, there's always the United States. When that was gone, there was panic. Until we found we could make it on our own."

Making it on their own had begun much earlier for the people of Taiwan.

As a laboratory for a new beginning, the island had much to offer. The Japanese, who occupied Taiwan for half a century before the end of World War II, had left working systems of transportation, communications, finance, and light industry.

"The Kuomintang came and adopted two very sound policies," I was told by Wang Tso-yung, a professor of economics in Taipei and an adviser to the government. "One, they planned to build a good agricultural base to improve the income of farmers and liberate farm labor for the cities. Two, they decided to develop industry that could make products that were previously imported, such as textiles and fertilizers."

The land-redistribution program allowed true tillers of the soil to own farms they formerly leased, yet placated the large landlords by paying them partially in the stocks of Taiwan's growth industries. Thus, new farmers and new industrialists were intimately tied to development of their country. Both prospered. Taiwan now produces 85 percent of its food, but imports wheat, barley, and soybeans.

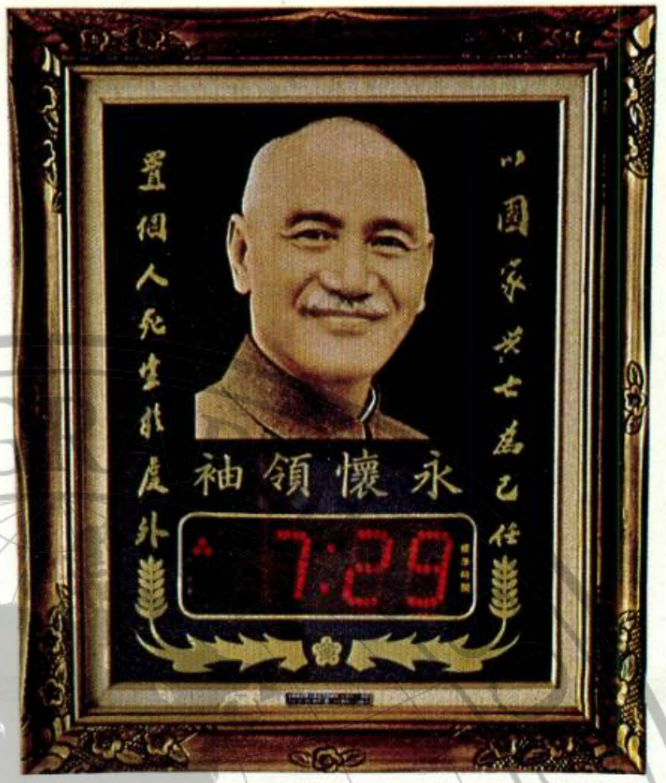
City Affluence Lures the Young

Near Taitung I waded into a paddy where old and new worked side by side. Eighteen-year-old Lin Te-wan shut off his motorized cultivator and turned to watch his father urge on a water buffalo. During the past 20 years, the use of these mud-caked beasts has declined rapidly. Young Lin's knotted upper arms suggested he was a man of the soil, but he said he had left a factory job to help with the rice planting.

"I like farming because it is more free, but I'm not sure I will stay," he said, looking into the distance, perhaps recalling the bright lights of Taipei.

A million or more like Lin Te-wan have left the countryside to work in the cities, principally Taipei. Kaohsiung, the southern port and a thriving industrial center, has grown from a few hundred thousand people to 1.2 million in a decade. Tainan, the oldest city, has half a million. Taichung and Chilung are also major metropolitan areas.

As in most large cities of the world, office buildings are high rises, as are the increasing



Aging custodians *of an illusive dream, members of Taiwan's Nationalist Party* ***(facing page)*** *met last March to rededicate themselves to a reunified China, with their system triumphant. Their late leader Chiang Kai-shek* ***(above)*** *smiles from a digital clock. A new breed of politician, Su Nan-cheng* ***(below)****, ran as an independent for mayor of Tainan—and won.*

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In step with "high tech," *a new shift arrives at the Philips electronics plant at Kaohsiung. Women do most of the assembling of the millions of silicon chips shipped to Europe for TVs and radios.*

In Taipei, Shen Tsu-wei polishes an overflowing inventory of shoes ***(below)****. With relatively low labor costs, Taiwan's exports of textiles and inexpensive shoes provoke protectionist sentiment in the U. S., the island's principal trading partner, followed by Japan and Kuwait.*

apartment complexes. There are few real slums. By 1978, 99.6 percent of all households had electricity. Chinese homes are uniform and outwardly plain. They are built around the family, not the dwelling, and in that respect they are many tiered.

I entered a house in Taipei at the elbow of a matronly woman who introduced me to her husband's brother and his wife, who also lived there. I was led to the second floor to meet an elderly grandmother resting out her days in the bedroom. On to the third floor for tea and a look at wedding pictures of a sister who had married and left the home. A young girl walked through, carrying an infant. School-age boys peered around doorways at the foreigner.

Sidewalks Are Safer Than Streets

Shoulder-to-shoulder living extends to downtown streets of major cities, which are human beehives during business hours. Dry goods and fresh fruits sit unattended on the sidewalks, but theft is rare. Crime is said to be on the rise, but I witnessed none, nor did I hear it discussed. I strolled in major cities day or night without the slightest apprehension. Except when I crossed the street.

Traffic is a growing problem, along with air pollution. From 1970 to 1980 the number of vehicles on the island increased from 820,000 to 4,700,000. A subway system of mass transit will be difficult. I found out why at 12:52 p.m. on January 29, 1981.

I was typing on the 11th floor of the Hilton Hotel when the room began moving and creaking like a loose-fitted truck bed on a rough road. With other occupants I began a frightened descent down the stairwell,

Taipei by night *glitters beyond the Grand Hotel* ***(above)****, a palatial temple of luxury that houses affluent travelers, foreign officials, and businessmen from around the globe who are drawn by government trade missions. Grilling sausages, a debonair street vendor* ***(below)*** *dramatizes today's growing prosperity on Taiwan.*

wondering all the while if I would reach the bottom sooner than I expected.

At 20 seconds it was the longest tremor ever recorded in quake-prone Taiwan, and at 5.6 on the Richter scale, among the strongest in ten years. Remarkably, there were no casualties or major damage.

Fortunately for the Taiwanese, their individual finances are more stable. Although salaries remain low by U. S. standards (factory workers average about $275 a month) and inflation is a government concern, indebtedness is rare. Installment buying remains uncommon. An economist told me that personal savings account for 13 percent of the gross national product.

A young couple with a year-old child told me they spent 35 to 40 percent of their income on food—"About average for people here." Eating is an art in Taiwan. There are elegant restaurants, with prices only slightly lower than those in New York City. But the quality of food in day-laborer noodle houses won praise from this Western tongue. I remember a five-course meal at a streetside stand in the agricultural city of Chiai that

CHANG SHU-HUA

cost less than two dollars, including a tall bottle of excellent Taiwanese beer.

"As much as Paris we should be known as the food capital of the world," said Linda Wu, editor of an English-language magazine, *Echo,* which celebrates Taiwan's growing prosperity. "We not only have great abundance, but also, thanks to the migration of 1949, we have regional cuisine from Shanghai, Fukien, Canton, and Szechuan."

Little is wasted. I ate parts of animals that I had never viewed as food. Consider fish lips, duck feet, chicken heads, and pig's blood soup. I was more impressed with rice cakes, lightly cooked vegetables, sliced piglet, fresh boiled shrimp, and an endless parade of dumplings. I sometimes felt that I was traveling around Taiwan by my tongue, averaging about 12 dishes to the mile.

The industrial menu is nearly as varied. Products, broadened from cloth and toys into hardware and machinery, now circle the globe: small farm harvesters and food-processing equipment to developing countries in Asia and Latin America; bicycles and electronic products to Europe and Australia; clothing and tools to the United States; toothpicks to the Middle East—and calculators to the Chinese mainland!

Well, not directly. Smuggling on the Formosa Strait has become a lucrative sideline for some Taiwanese fishermen. On the other hand, many goods also flow legitimately from Taiwan to Hong Kong, then quietly reach third parties on the mainland.

Taiwan's industries have been so successful that they promise to move "Made in Taiwan" labels into a higher-quality market. "We've been sharing the bottom range of export products with places like Korea and Hong Kong," said Bert J. Lim, president of *World Economic Press*. "We've become the best of the bad, but cheaper than the very good."

Rising wages are edging Taiwan's product prices closer to the middle range dominated by the United States. "We are attempting to change from a labor-intensive to a technology-intensive setup," said Dr. Chen Sun, vice-chairman of the Council for Economic Planning and Development. "The government is encouraging industries

"Stayin' Alive" *and other Western disco tunes get hearts pumping early in the morning at the Chiang Kai-shek memorial in Taipei. Chiang, who all his life*

promoted Spartan exercise regimens, might turn in his grave at this new twist.

to do so with special incentives, such as tax advantages."

The drive toward production may be exacting a bigger price than employee-benefit programs can pay, according to Professor Chang Shiao-chun. The sociology teacher and researcher surveyed some 4,000 workers in 80 Taiwanese factories.

"The law calls for an eight-hour day, but it's often longer," he told me. "Also, most of the workers I interviewed work 28 days a month, and get every other Sunday off. We have unions, but they are controlled by the Kuomintang. And labor strikes are against the law."

Women's Role Undergoing Change

Women dominate the labor ranks in textile and electronics industries, but economic liberation has brought social problems.

"When they finally get days off, tension has built up and things happen hastily," said Professor Chang. "We are experiencing an increase in pregnancies out of wedlock."

A more typical model of Taiwanese femininity, however, would be Lin Li-huan, a 29-year-old bookkeeper with a Taipei auto garage. Her mouth was the shape of a cupid's bow, her smooth skin the color of light cream. She spoke no conversational English but possessed a collection of Americanized expressions, such as "Long time no see." Told that I was an early riser, she nodded knowingly and said, "Keeps early hours."

Our discussion through her interpreter friend drifted during one long Sunday meal to the censorship of American films in Taiwanese theaters. The Chinese, she said, were much less frank about relations between men and women. Even married couples, she believed, did not discuss them.

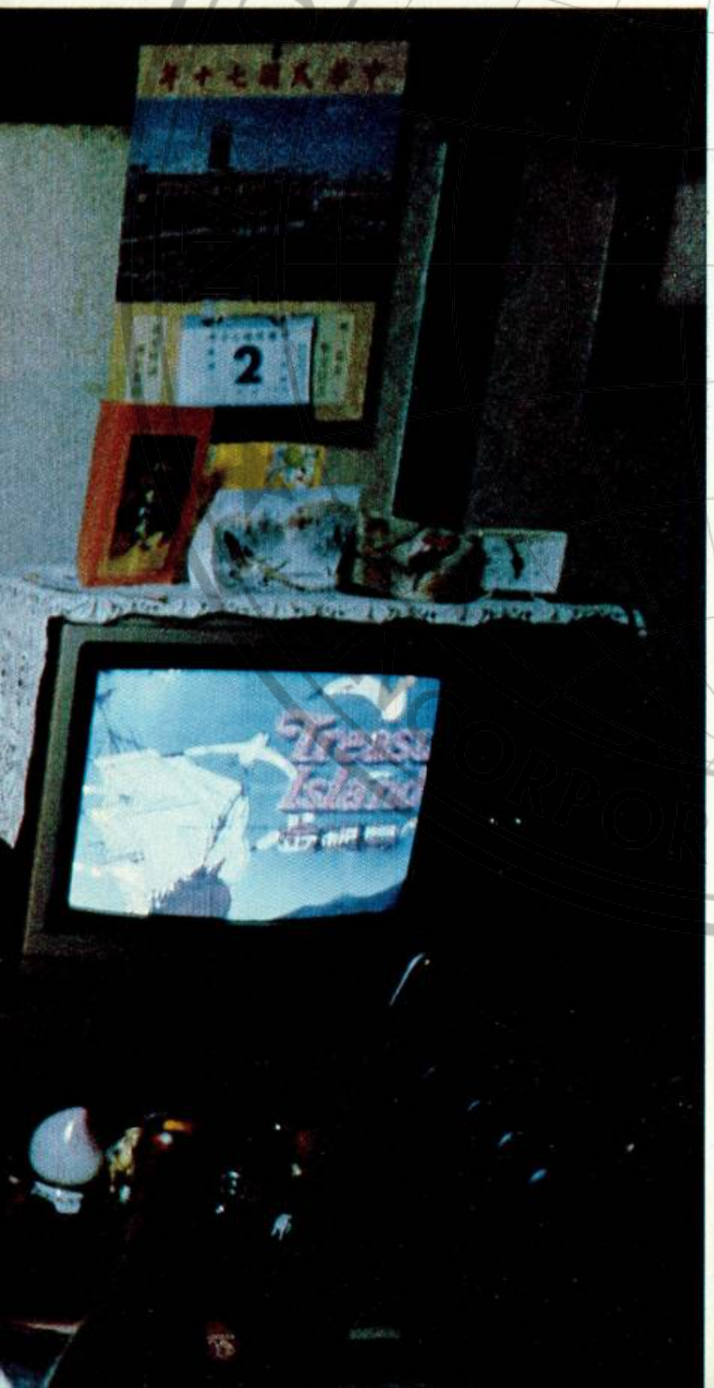
Was this, I asked, the boldest conversation that she had ever had with a man?

"Oh yes," she said, with a little laugh. Both hands flew to her cheeks as her creamy skin turned the color of cherries, and to my mind flashed a candidate for a new American idiom: "Modest as a Chinese maiden."

The industrial dynamic carries with it physical as well as emotional wounds. On the day the researcher Professor Chang and I talked, the Taipei papers reported that three young workers had lost fingers in industrial accidents the previous day.

Food for the spirit world, *a Chinese New Year's feast (**below**) is offered to ancestors before the living partake. Thus appeased, family spirits will refrain from causing mischief for survivors. Part and parcel of precepts that have governed Chinese family life for centuries, ancestor worship begins with elaborate burial rituals. Near a northern village, mourners in traditional funeral garb (**left**), bearing incense, bury the head of their family.*

Adherence to such customs is fast eroding; cremation is now more common in cramped urban areas. Respect and responsibility for the elderly, still powerful forces for family unity among rural Taiwanese, have begun to diminish; now government assumes more responsibility for social welfare.



A government that is eager to produce may not be quite so eager to penalize factory owners for poor safety standards.

In 1980, 34 workers drowned when a mine named Forever Safe was dug too close to a riverbed and water collapsed the tunnel wall. Two days earlier a government mine inspector had given his stamp of approval to the tunnel's progress. A surviving worker, aware that visiting inspectors are well entertained by company officials, commented sadly: "He heard the sound of the wine, but not the sound of the water."

In many ways Taiwan is hearing the sound of change. The tide laps at morality, erodes the once tight Chinese family, washes over traditional arts and culture.

"Responsibility to the family traditionally has been more than just love," I was told by Moh Han-chu, a mainlander in his 70s. "In earlier times, even if your parents were not nice to you, you were still responsible to them in their old age.

"My wife and I have seven children," he added. "Six of them are in the United States, and the one still here does not live with us. They are all good to us, but this is different from the old ways."

Culture Encompasses Old and New

Entertainment is different as well. The movie district in Taipei is jammed every night with ardent cinemagoers hooked on action-packed American films. Folk arts such as puppetry and paper cutting have been reduced to novelties as the beat of life changes from the lute to the electric guitar.

But in the slide toward change, more and more Chinese are grabbing at handholds of tradition. One Peking opera company has come back strongly by making a few concessions to modern tastes. And in the modern dance performances of Taipei's Cloud Gate Dance Theatre, distinctly Oriental movements now merge with those learned at the feet of Martha Graham. Both opera and dance have a faithful following.

If the brainpower of progress and culture may be found in Taiwan's capital, the heart still pumps strongly in the countryside. I made a trip around the island for a better feel of its pulse. Taiwan has charms too often overlooked in the rapture over its success. The eyes of Portuguese sailors were

unclouded by progress and population in the 16th century, when they proclaimed it "*ilha formosa*—beautiful island." The name stuck with Westerners, although the Chinese had called it Taiwan for centuries.

Away from the cities, lush subtropical growth covers hills too steep to farm. Even the tilled areas hold a patchwork comeliness, a look of well-manicured efficiency.

Still, the new China shows itself in large industrial cities like Taichung, a small-scale Los Angeles, expanded in deference to the automobile with high-speed thoroughfares and a neon downtown.

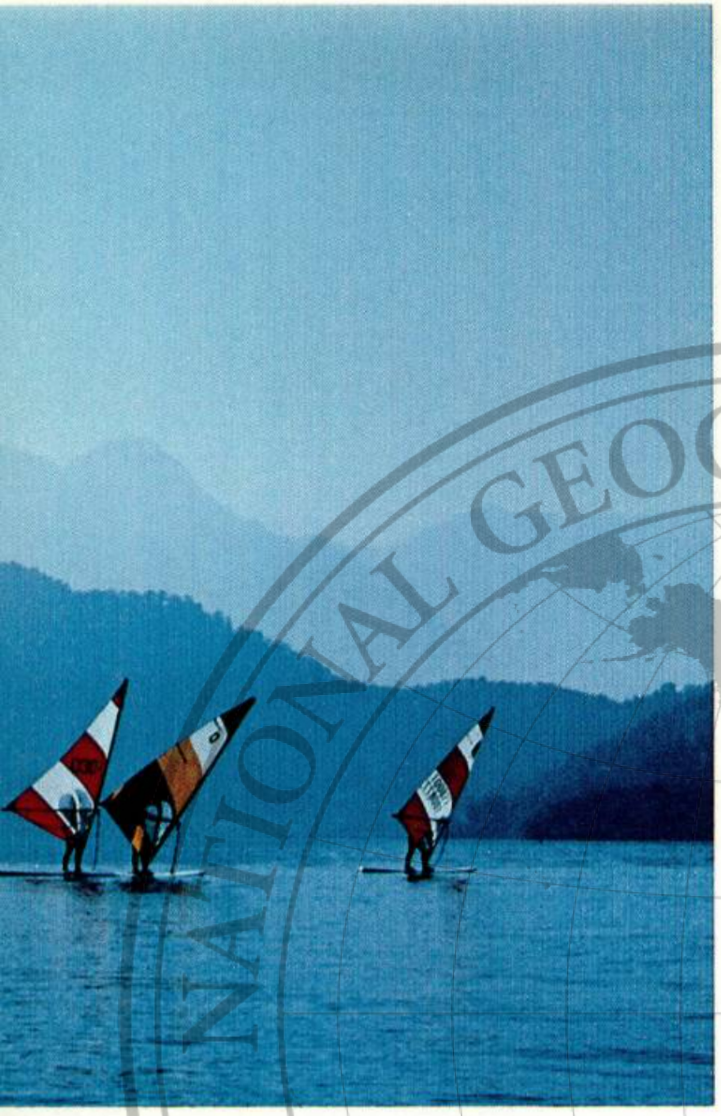
Farther down the island the mayor of Tainan wants to make his city both a metropolis and a refuge from itself.

"I want to create satellite communities around us, with Tainan the center, the quiet star," said Mayor Su Nan-cheng as he sat at the edge of his office couch, with his arms chopping the air enthusiastically. "Cars will be banned downtown. People will move around by horses and bicycles!"

The pudgy mayor symbolizes the new politician in Taiwan—young, energetic, adaptable to the present yet in touch with his past. In 1980 he arranged for a display of 3,000-year-old artifacts and drew crowds of half a million. He attends banquets nearly every night and jogs before every dawn. He invited me to join him in both activities.

Banquet Toasts Test the Strong

Alcohol on Taiwan is consumed mostly with social meals, in the form of the rice wine called *shaohsing*. Participants are exhorted to salute everything from mutual good health to the arrival of a fish course by draining their glass at the command to "*kan-pei*—bottoms up." As honored guest I was urged to a kan-pei by each at my table of six, despite my pleas to *sui-i*, or drink at my own pace. Representatives from other tables



Sun Moon Lake, *a gemstone set amid mountains and tea plantations, serves the new Taiwanese pastimes of sailing and windsurfing. Known for the quality of the yachts they build and export, islanders are just beginning to test their own sport-sailing know-how.*

then came to honor me as well. The mayor, well known for a prodigious capacity, added more for good measure.

There is a Chinese proverb that to depart from a social meal sober is to reveal that you did not truly enjoy yourself. If the saying is true, I left the party ecstatic.

Pride forced me out of bed the next morning at 5 a.m. to join Tainan's mayor in his predawn ritual. The crunch, crunch of cinders on the track of the municipal stadium told me that others were heeding his example of fitness. In a parking lot outside the stadium, dozens more were stretching in the popular exercises known as *tai-chi chuan.* As it grew light, we set off in a leisurely walk-run through an athletic complex already thumping and poinging with basketballs and badminton. Dozens of matrons turned and bobbed in mountain folk dances to recorded music, probably scant hours after their children and grandchildren had gyrated to the throb of discotheque music.

It is the beat of industry that sustains Kaohsiung, some 25 miles south of Tainan. Dormitories and recreation halls for employees sit at the perimeter of giant government-owned complexes such as China Steel and China Shipbuilding.

"Our steelworkers come from many parts of the island," said W. P. Chuang, as we watched glowing slabs race down the line. "They work here during the week and visit their families during the weekend."

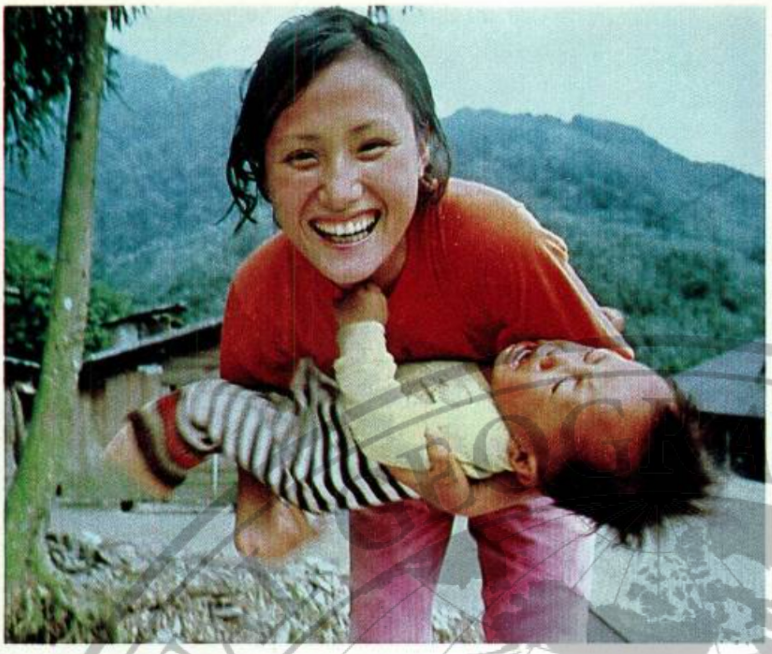
Some of that steel travels next door to China Shipbuilding. World conservation measures and Middle East conflicts have stymied the construction of supersize oil tankers elsewhere in the world. But in the past four years Taiwan has built and delivered two vessels of nearly half a million tons each. Another mountain of a ship, one of 210,000-deadweight-ton class, was taking shape before me on the ways.

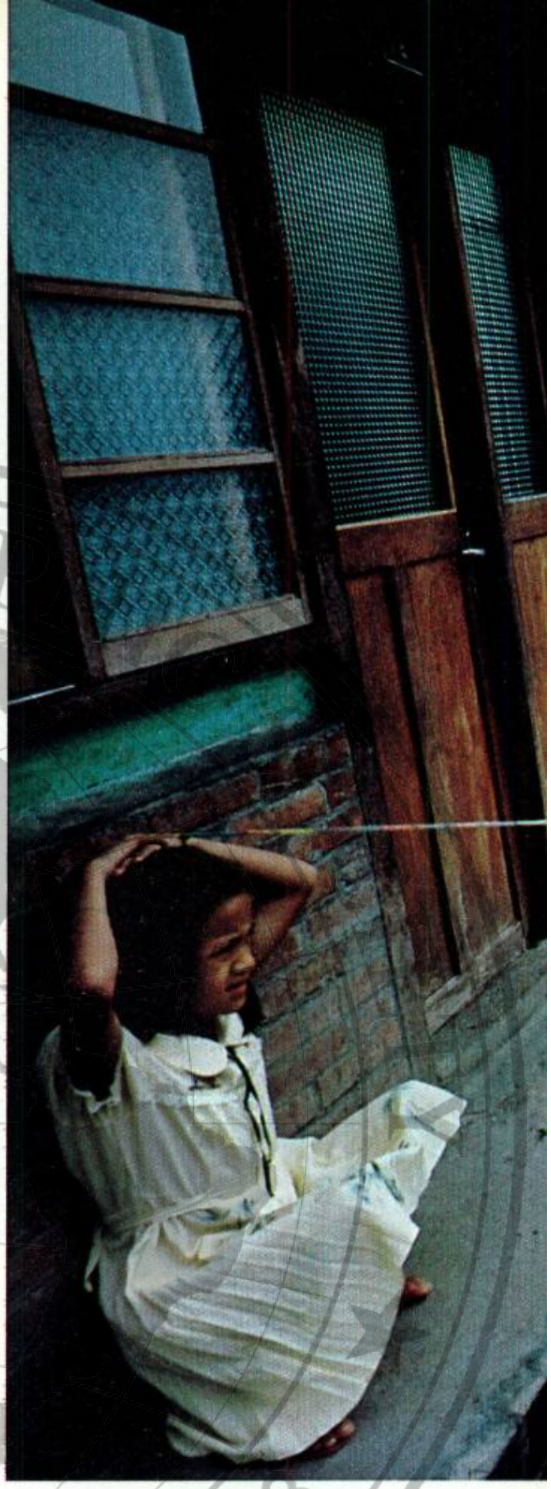
"Our quality control and delivery times are good, and our prices still competitive," said company spokesman N. S. Wang.

Industry and oppportunity are in shorter supply on the narrow east coast, which for years was cut off by the high spine of mountains. Between Hualien and Taipei the range sometimes extends to the water's edge, creating some of the most precipitous seaside cliffs in the world.

But the most awesome expression of Taiwan verticality is Taroko Gorge, nature's monument in granite and marble. An ethereal setting, the gorge is a road-building hell, but one that was necessary to end the east-coast isolation. With pick, shovel, and dynamite the East-West Cross-Island Highway was sculpted in less than four years during the 1960s, at a cost of 176 lives.

Work, sacrifice, the evidence is everywhere. Amid the splendors of Taroko I encountered a man and his wife scooping gravel into a truck. He was a mainlander,

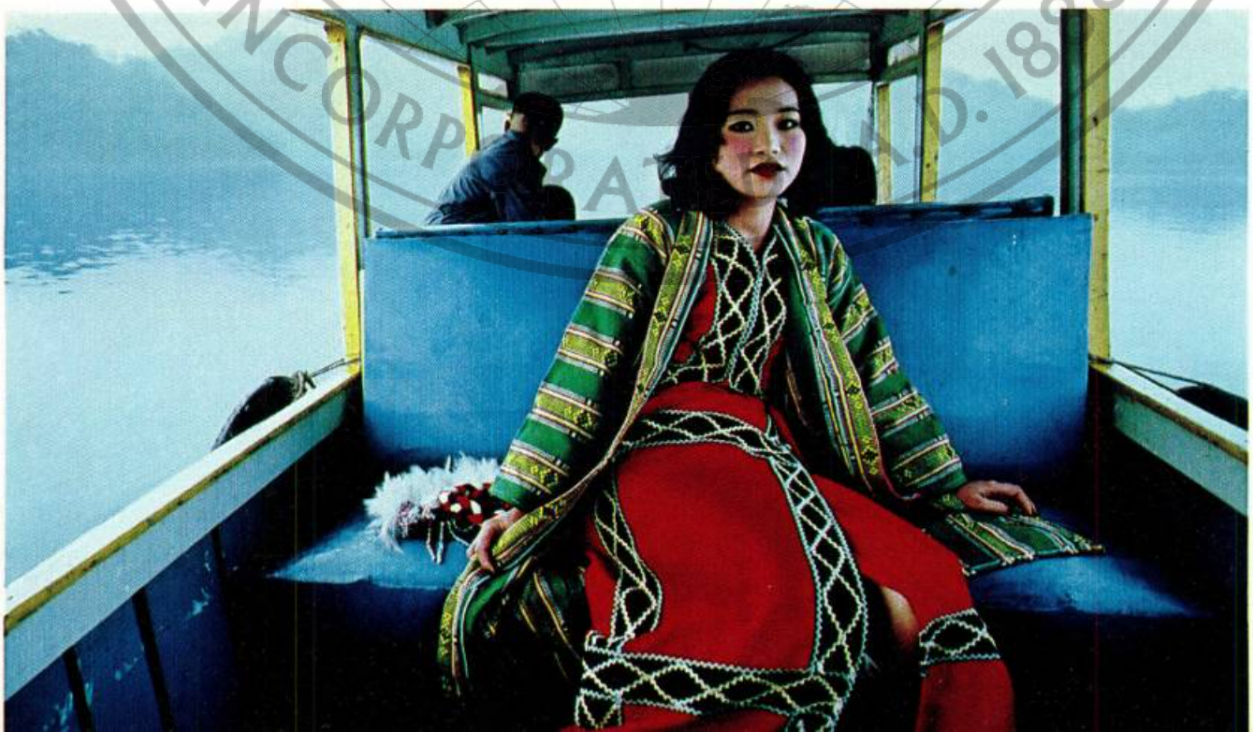




The first Taiwanese, *aborigines inhabited the island long before the first immigration of Chinese. Nine tribes, each with a different language, now account for only about one percent of the population. Though their origins have not been conclusively traced, some are thought to be of Malayan stock. In many of their 240 villages, most located among the high central mountains, the elderly and children predominate; others venture to the cities and Taiwan's mainstream.*

*Near Ilan, children of the Atayal tribe rule the street during school recess (**right**), while a young mother shows off her son (**above**). The Atayals and other aborigines also find a lucrative livelihood in catering to tourists at Sun Moon Lake. After dancing at a lakeside resort, a young entertainer (**below**) returns by boat to her village.*

Through education the government encourages assimilation of the aboriginal minority. The nine years of compulsory school attendance required of all Taiwan's children has given the island population a literacy rate of 90 percent.



she was Taiwanese. He straightened to talk with me, but she scooped for interminable minutes without a break.

"My wife came from a poor family," he said, "and has always worked hard. But her life is better than before. The work is hard, yes, but we do not mind because there is much to do to develop our country."

To develop our country. . .

Throat-swelling patriotism and unabashed statements of national duty, out of vogue in most of the developed world, are common in Taiwan. There is justifiable pride in the accomplishments of recent years, but the tightest glue for unity has been the sense of threat from outside force—the Chinese Communists.

A battleground psychology is encouraged in Taiwan. Continued resistance to Communist infiltration and espionage, according to the KMT, requires strict vigilance. But the restraints, in effect for more than 30 years, appear to be wearing thin.

When I spoke to one of Taiwan's dozen non-KMT legislators one day, he tossed a heavy book onto the table in front of me. "Here is our constitution," he said. "We are essentially governed by one page of it, which gives us what is virtually martial law."

The measures restrict true freedom of

expression, including public demonstrations against the government, and impose subtle censorship of the press in the interests of "national security." Publications that the government deems upsetting and confusing to the populace are occasionally banned.

In mid-1981 cries of repression echoed halfway around the world when Taiwan-born Chen Wen-cheng, a statistics professor at an American university, was found dead in Taipei. Taiwan's security police said that he died in an accidental or suicidal fall after being confronted with evidence that he had propagandized against the KMT in the U. S. The postmortem did not satisfy some members of the U. S. Congress, who called hearings on the question of Taiwan's agents spying on Taiwanese in this country.

"When the KMT came to Taiwan 30 years ago, security was a problem," I was told by a man in a Tainan coffee shop. "Many people now feel that martial law is no

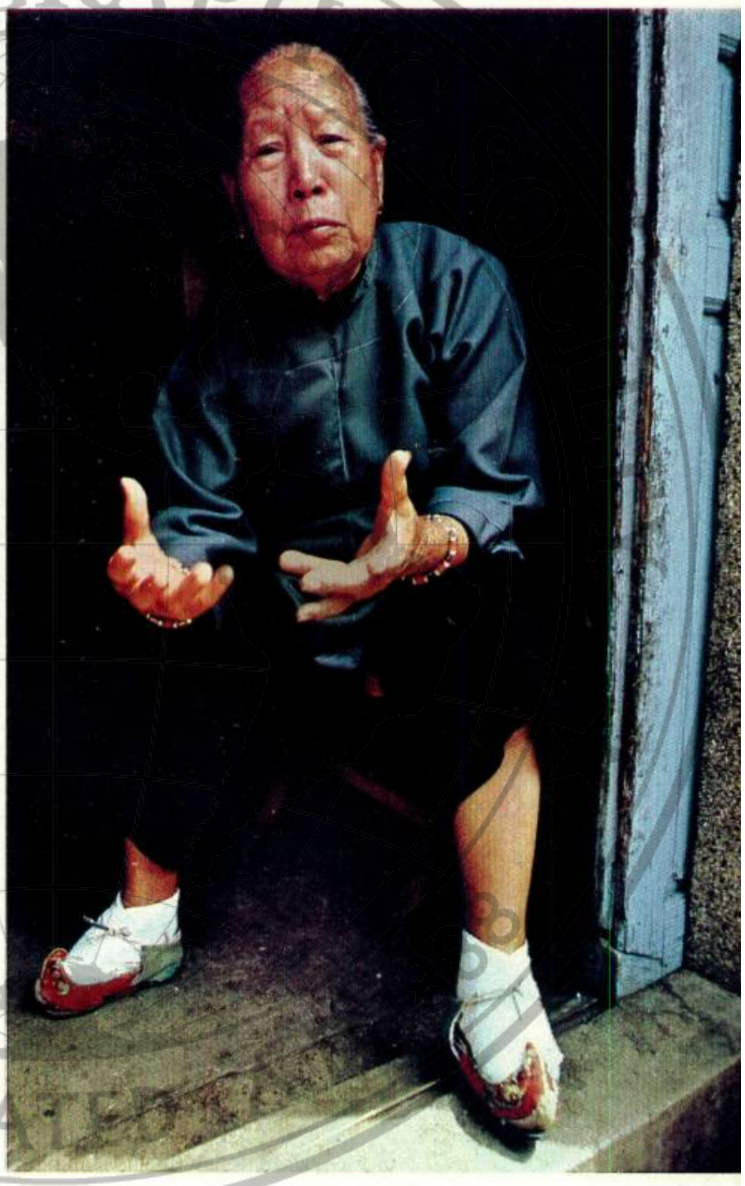
longer necessary. But the men in control are old men who remember the civil war vividly, and they are not willing to loosen up."

He shrugged. "It's not yet a big problem, as long as the economy is going well."

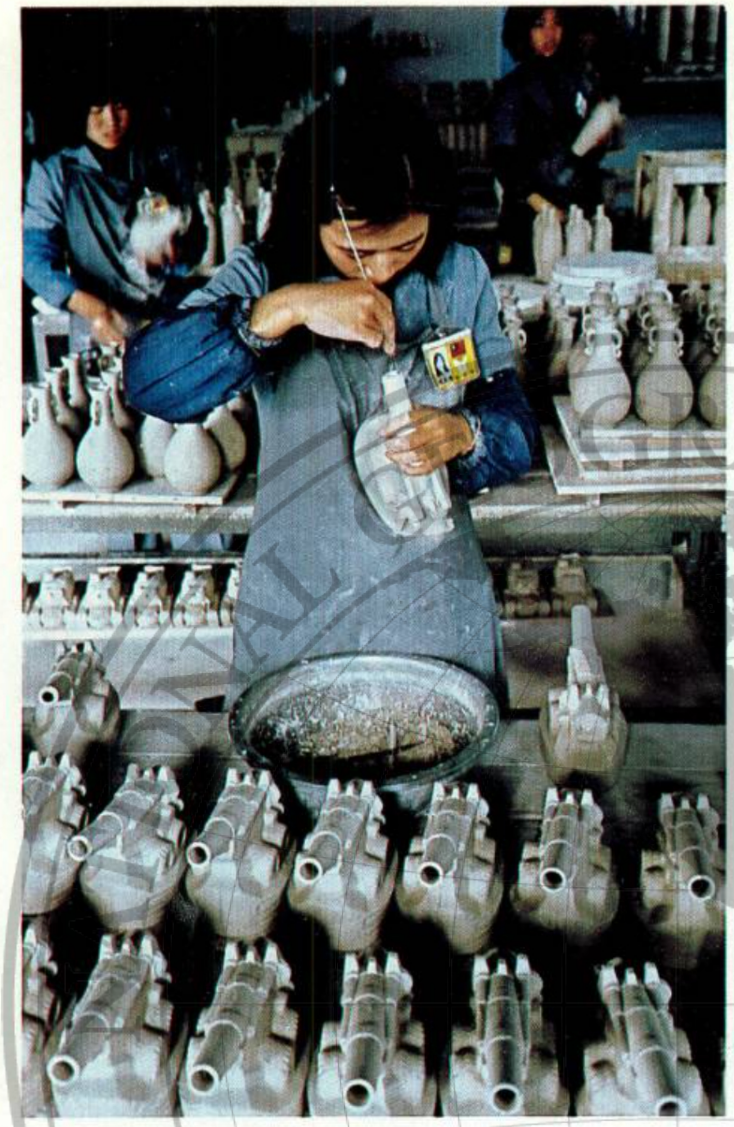
The Kuomintang, of course, controls the government, and the mainlanders, though a minority of the total party membership, hold most of the top party positions and a vast majority of seats in the legislative Yuan—and thus dominate the government and military as well as the Kuomintang.

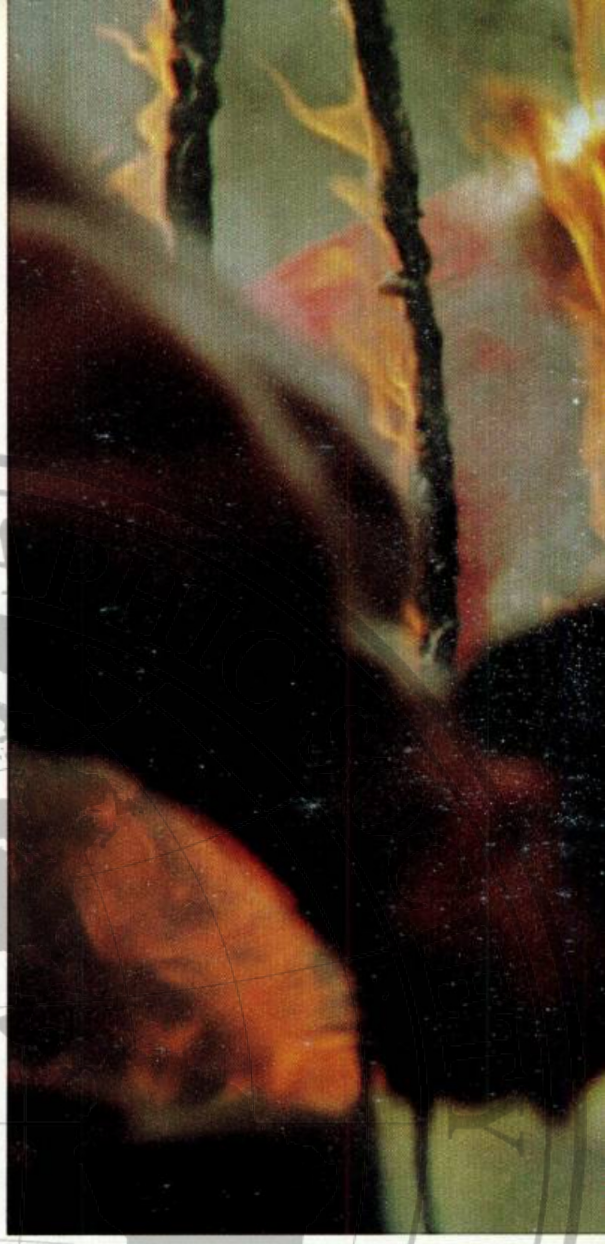
Other parties exist—Young China and the China Democratic Socialist—but have little power or influence. The KMT has access to government funds and effective control of the news media for its campaigns. "If our speeches sound too critical, we can be arrested as security risks," a non-KMT candidate told me.

If the hand of government rests heavily on the people, so also the hand of time



Relentless winds *stunt vegetation on Chiangchunao—one of Taiwan's Penghu, or Pescadores, islands—though peanuts and sweet potatoes are profitably grown. Stunted by a cruel custom, the long-discarded Chinese tradition of foot-binding, islander Hsieh Chen-chuan* ***(above)****, 90, barely walks with the aid of a cane.*





Burning with patriotism, *marine recruits reflect the national attitude as they plunge through hoops of fire during ceremonies at Tsoying Naval Base. Since the U. S. officially severed diplomatic relations with Taipei in 1979, millions of islanders have donated 94 million dollars for Taiwan's defense.*

*Few nations are more combat ready than Taiwan. Military service is mandatory for men and attractive to women, like these parading air force cadets (**right**). A fourth of the half-million-man military maintains a constant vigil on the islands of Quemoy and Matsu, within sight of China, although artillery exchanges with the mainland ended in January 1979. Though the guard is never lowered, more peaceable pursuits can now be seen on Quemoy, where craftsmen produce bottles shaped like guns (**above**).*

Climbing to the top *of 11,000-foot Mount Hohuan, one of 62 peaks in Taiwan that exceed 10,000 feet, young Chang Tsu-hou braves his first freezing temperatures in his father's coat. Straddling the Tropic of Cancer, Taiwan has its south in the tropics, its north in the subtropics. But the people know only one direction: up. Why do they not declare independence, making Taiwan a nation, not a province? Such a move would invalidate the present government. Worse yet, many fear, it would invite intervention from the mainland. And so Taiwan plays its waiting game.*

rests heavily on the government. Of 399 members of the legislative Yuan, some 300 represent mainland districts to which they were elected in 1948. They hold their seats for life or until the Taiwan government regains control of the mainland and calls new elections. The former appears more probable; 76 are more than 80 years old, and some 200 are between 70 and 80.

While the number of mainlander seats has diminished through natural attrition, other seats have been added to reflect the growing island population. Increasingly they are filled by Taiwanese, not mainlanders. How will that affect an island that for 32 years has been headed by a people dedicated to leaving it?

Although the Taiwanese share the mainlanders' distrust and distaste of Communism, their aversion to a relationship with the PRC seems less pronounced. "As long as the two can survive separately, they will," said a Taipei industrialist. "But I think with time the reasons for remaining apart will become less and less clear. After all, they have natural resources that we need, and we have industrial know-how that they need. But reunification? It's impossible right now."

President Chiang Stands Fast

The leader of the powerful KMT is a man of quiet charm and an almost cherubic smile. When he received me in the graystone party headquarters, I detected a slight tremor in the hand of 71-year-old President Chiang Ching-kuo. But his attitude toward the island's old adversaries appeared as unshakable as his father's had been.

"There's no change in our policy," he said. "We have confidence and resolve that we will restore freedom to the mainland. This is not a question of power against power. It is a matter of two systems, two sets of attitudes and two completely different ways of life."

I told the president that in my talks with people around the island there was little doubt that the government enjoyed wide support. Yet there were many, I added, who felt they were denied personal freedom.

"The ROC is a country facing a Communist threat," he responded. "The Communists are constantly trying to infiltrate the country and drive wedges between the people and the government.

"We know there are people critical of some of the government's policies, and we welcome any constructive criticism that is helpful to the progress of the nation."

What is constructive and what is a threat? The differences are still unclear on Taiwan. Meanwhile, the desire for more public participation in government grows stronger.

Discipline, Patience – and Hope

Taiwan seems a political volcano that bubbles but never erupts. The political tremors, not unlike the earthquake I felt, set the house of government to creaking and grumbling but never tumbling down. The reasons may lie in the Chinese themselves, with their respect for success and their elders, and in their capacity for patience.

"Change is coming as these older ones pass from the scene and young people with a different view of the world are elected in their place," said a magazine editor whose publications have been banned three times. "We need to be prepared for that change by speeding up the democratic processes in Taiwan now. But we recognize that economically much has been accomplished."

Conciliatory talk for a man considered an opposition journalist. It paid homage to the turbulent past and the successful present, and looked forward to a changing future.

It reminded me of the morning that I ran with the energetic young mayor of Tainan. We had slowed to a walk as he pointed out the facilities of the athletic park. A runner passed us, shuffling in tiny steps, an old man tall and thin, his arms pumping determinedly, the tendons at the back of his neck sticking out like rubber bands.

Smiling, the mayor shouted after him in the sharp cadences of a military march, "*I-erh, i-erh!*—One-two, one-two!" Without turning, the old man responded, the words floating back like a hoarse echo from the past: "I-erh, i-erh."

The mayor chuckled, and his eyes softened. "He is a retired soldier," he said, "and he keeps up his self-discipline. He is out here running every morning."

We walked on, past basketball and tennis courts, accoutrements of leisure in a successful Taiwan. The old soldier shuffled on ahead, the voice growing faint in the distance. "I-erh, i-erh, i-erh. . . ." □

The Threatened Ways of

By ELIZABETH L. MEYERHOFF

CROUCHED IN THE CORNER of Siwareng's smoky hut, I could sense the importance of what was going on. In the crowded room, firelight stabbed the darkness to catch a gesture or the expression on a worn face. Seated bodies swayed; voices chanted in rhythm.

Everyone was absorbed in the ceremony of *parpara*. Among the Pokot people of Kenya, this ritual is performed before the birth of a first child. Only the older Pokot men and women are allowed to be present. Far from my California home, I was here only because the Pokot had accepted me as a student and observer of their ways.

Parpara ritually cleanses and purifies the parents-to-be and their extended families; it attempts to exorcise all evil from the unborn child and ensure a healthy baby.

Lokor, a tribal elder, knew the complex history of Siwareng's family. While the others handed around a wooden mortar, Lokor sang out phrases, each one reciting a fragment from the past of Siwareng or his wife. The people chanted in slow, melodic refrain, voices and rocking bodies joined to will away all badness. Each man, as he passed the bowl, swirled the water and red earth in it with his fingers, blessing the "words" stirred into the bowl.

"We came to eat the black goat," Lokor intoned somberly. He was referring to the slaughter of a goat, a ritual performed years before to exculpate a member of Siwareng's clan who had accidentally killed another Pokot. The fire burned lower, but the participants continued singing until dawn.

Next day, what a different mood prevailed for the climax of parpara! Relatives and neighbors formed a chain of singing dancers, each man holding the waist of the woman in front of him. Old women welcomed the celebrants, blessing them by smearing milk on their foreheads.

Villagers streamed into Siwareng's hut to dance around the expectant couple. Siwareng's wife carefully held between her legs the mortar with the magic mixture. At a signal from Lokor, the bowl was tipped over and its contents spilled, carrying away all wrong actions with the stirred-in words and symbolizing easy birth.

Parpara, named after the Pokot word for "stir" or "mix," exemplifies the depth of responsibility, of interdependence, that the Pokot feel toward one another. The ritual is one of many that form a pattern of belief and social structure. To the Pokot, communal blessing can bring healing; witchcraft and sorcery can cause illness. Such spiritual sway rests on intimate knowledge of each other's behavior, past and present.

After death, and for many generations, a person's spirit still wields power. A moral bond continues to link the living and the dead. Since an ancestor, if angered, can harm a live descendant, elders through their blessings try to appease departed spirits.

The Pokot are an exceedingly proud people, colorful in personality, appearance, and social practice. They constitute a subgroup of the Kalenjin, a Nilo-Hamitic linguistic family. Their population of about 220,000 is spread over a remote region of western Kenya and eastern Uganda (map, page 123).

Among the least acculturated tribes of East Africa, the Pokot have traditionally remained aloof from pressures of modernization and development. But new roads through their lands and social projects with

Baby shower *Pokot style: A mother bathes her daughter with a well-aimed squirt, an intimacy that comes easily to one of Kenya's least assimilated tribes. The Pokot, self-reliant tillers and herders, cling stubbornly to their own traditions in a nation intent on putting tribal ways behind it.*

Kenya's Pokot People

Photographs by MURRAY ROBERTS

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the goal of progressive change are threatening their fragile and cherished culture.

My friend and mentor, the late Dr. Louis S. B. Leakey, promoted my first visit to the Pokot. That was in 1972. Six years later I was still there, applying the broad approach of social anthropology but focusing on the socioeconomic and ritual position of women. What began as a youthful yearning for a reality different from my California upbringing had evolved into a long-term research program conducted with the permission of the Kenyan government and funded by the National Geographic Society and the L. S. B. Leakey Foundation.

On my initial venture into Pokot territory, an old man, P'katieny, introduced me to the timeless perceptions of his people. One night, explaining the Pokot names and symbolism of various stars and constellations, P'katieny pointed to the Milky Way and said, "*Are po tipin*—path of girls." What a delightful metaphor, I thought—comparing the star drifts of heaven to the gaiety of young girls skipping off, perhaps, to a dance, fancied up in oiled wooden necklaces and beaded skirts!

By the position of the morning star, P'katieny informed me, his people could predict if their small children would stay healthy or when it would rain. To which I countered with a truth just as fantastic: Pointing to the shining lunar disk, I mentioned that the Americans had gone to the moon. Displaying no surprise, P'katieny simply said, "Then there aren't any Americans left on the ground." At the time I didn't know enough Pokot to clear things up.

I settled in at Chepoptukoi, a community of about 30 families in the agricultural area of Wei Wei. The people of the community helped me build a hut where I wanted it, on a piece of valley land beside a river. The men chopped the trees and erected the frame. The women and I cut bundles of grass to thatch the roof. I paid them with beer made

from fermented maize and finger millet.

It was not long before I felt isolated in my streamside dwelling. The Pokot themselves lived in the hills, coming down to the valley to work in their irrigated maize fields.

"In the valley," explained an old woman cryptically, "there are no stones to sit on."

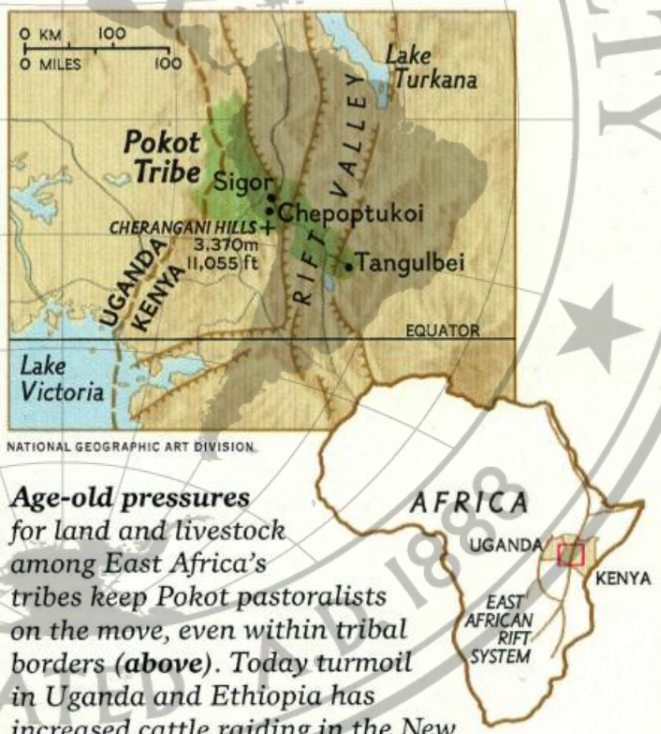
From the Hill You Can See Forever

A year later, after I had built a new hut on the Kaipepet hill, I appreciated her meaning. By that time I had spent hours sitting on my favorite stone gazing over the green and tawny foothills to the immensity of the East African Rift. There are, of course, other practical explanations: Malaria is more prevalent near the rivers, and, in more warlike times, the people used certain upland caves as lookouts to warn of attack by cattle raiders coming across the valley.

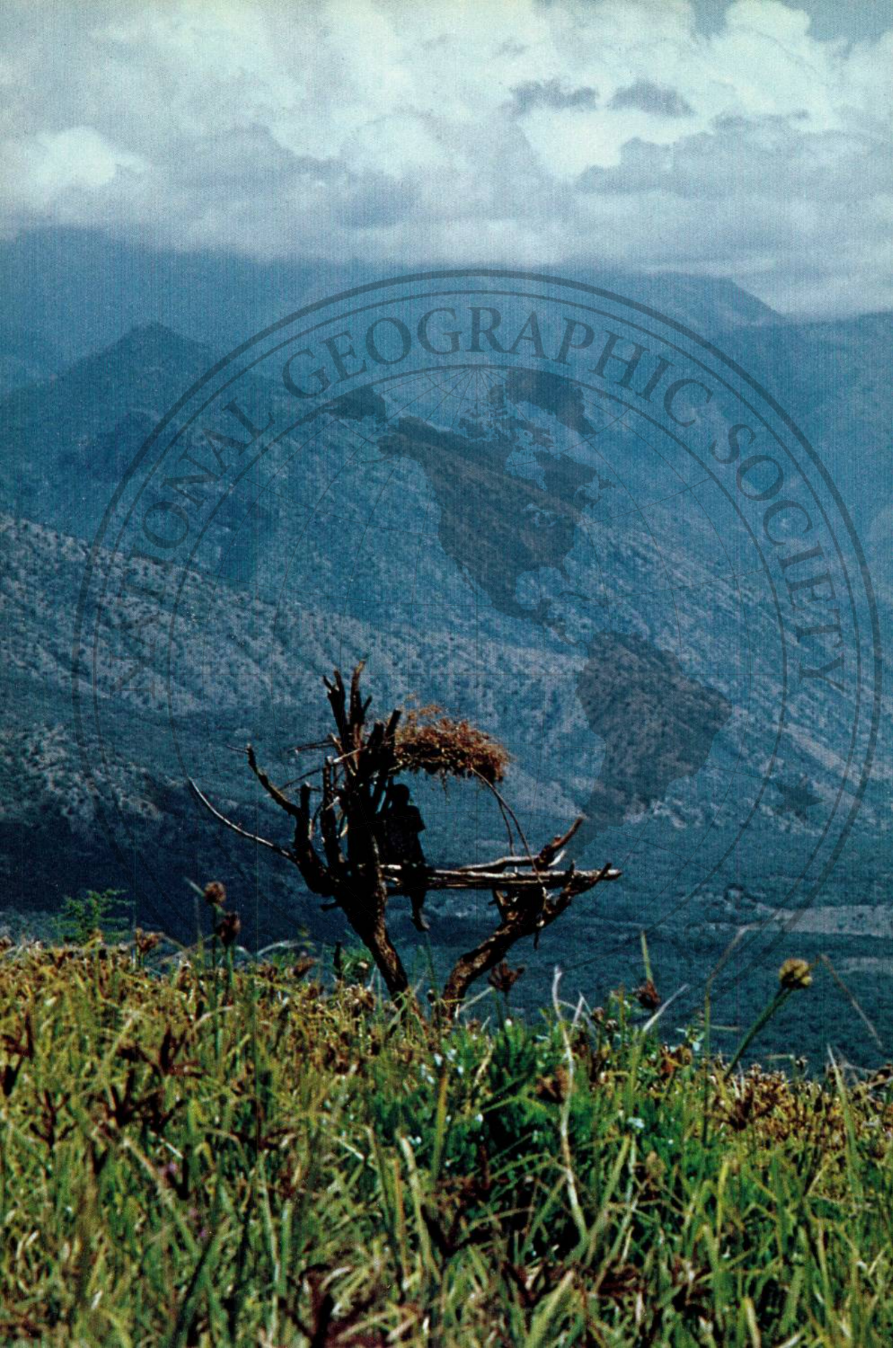
But to sit on a stone in the evening, watch the goats come home, hear a baby cry or a woman sing, and see the fire of each neighbor light up in its familiar place was to know that all was well in the country.

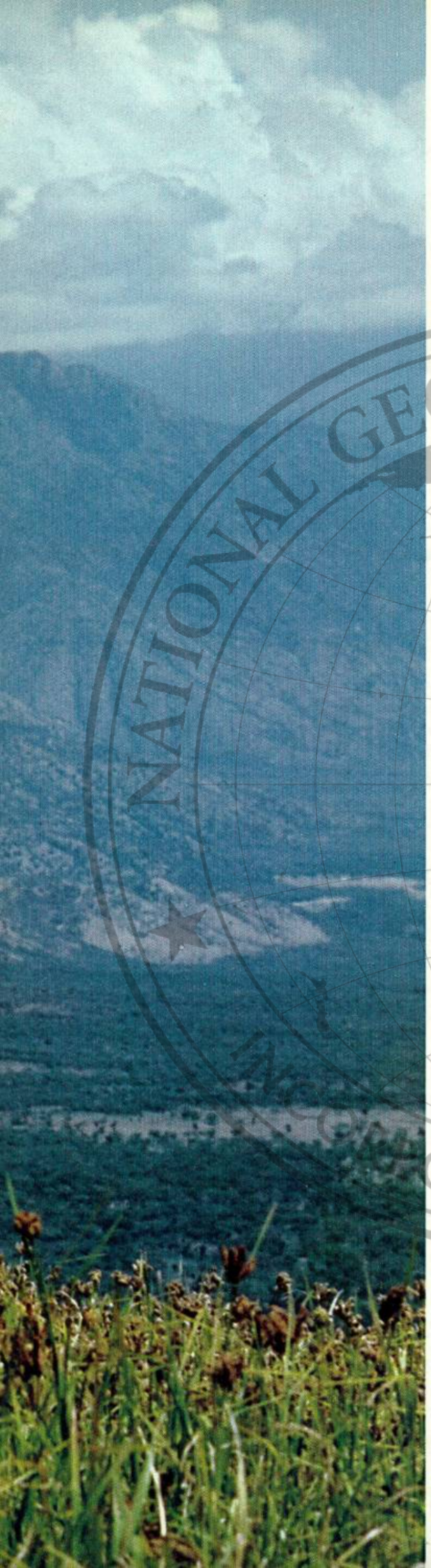
The people of Chepoptukoi thought it very strange that I should want to live among them, and even stranger that I would climb high into the hills and visit their homes. But slowly we became friends. I was called Chemachugwo, *che* denoting femaleness, and *machugwo* a local tree. Both to learn about the Pokot and to gain their acceptance, I lived, ate, and worked as they did. I went down in the morning to hoe my own field, and when the hoped-for rains came, I planted my own maize and millet.

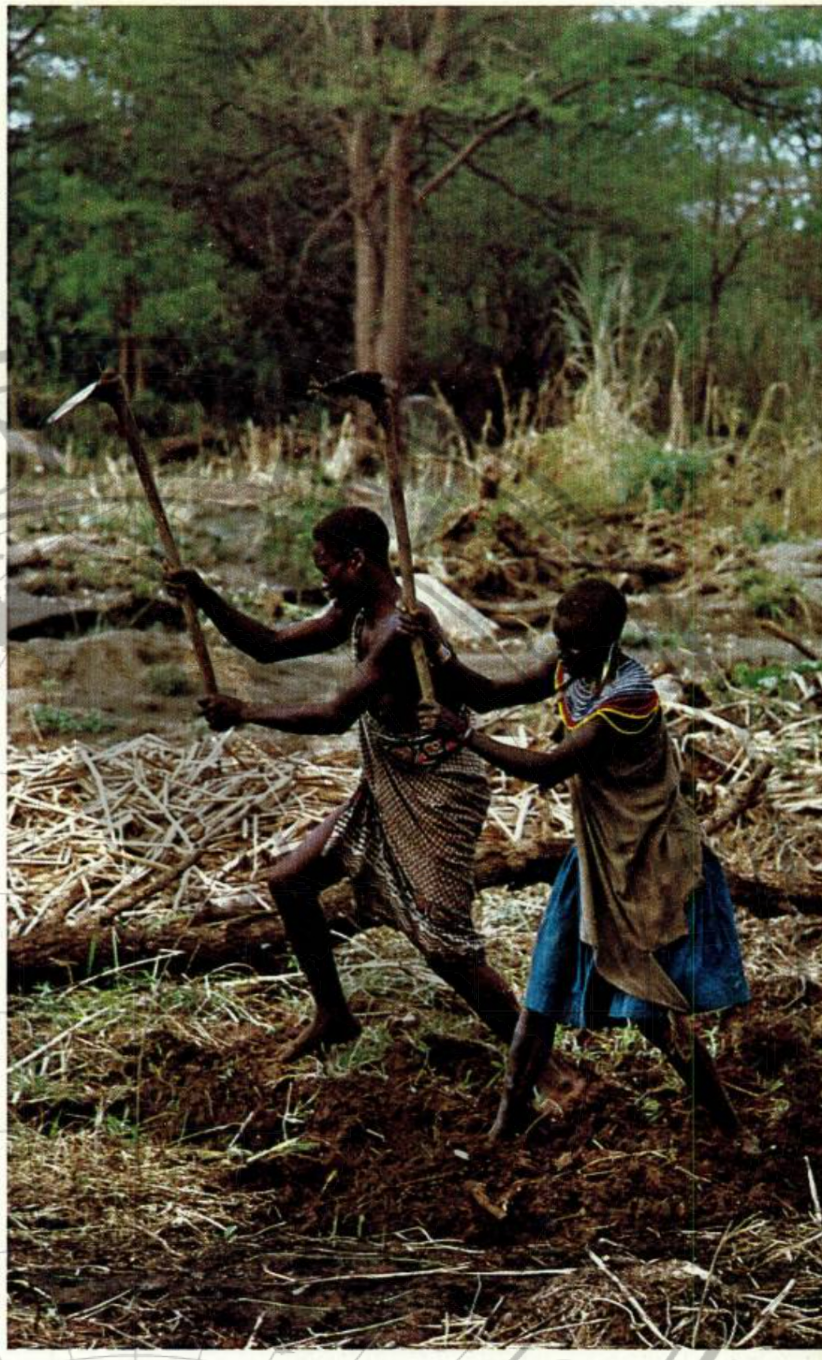
I soon realized that I gained most respect by being myself, yet willing to learn the Pokot language and perform their tasks, rather than by pretending to be one of them. In studying the language, I had help from Paul and Rachel—young Pokot educated in mission schools who spoke quite good English. There is no standard writing system for the language, so I had to devise my own



Age-old pressures *for land and livestock among East Africa's tribes keep Pokot pastoralists on the move, even within tribal borders* ***(above)****. Today turmoil in Uganda and Ethiopia has increased cattle raiding in the New Jersey-size area of volcanic hills and semiarid plains that support some 220,000 Pokot. Fearing a raid, a woman moves household goods amid a cloud of insects* ***(left)****, while men and children drive the family's stock to new pasturage. The Kenyan government, now building roads through the once remote region, tries vainly to curtail the endless cycle of raids and counter-raids.*

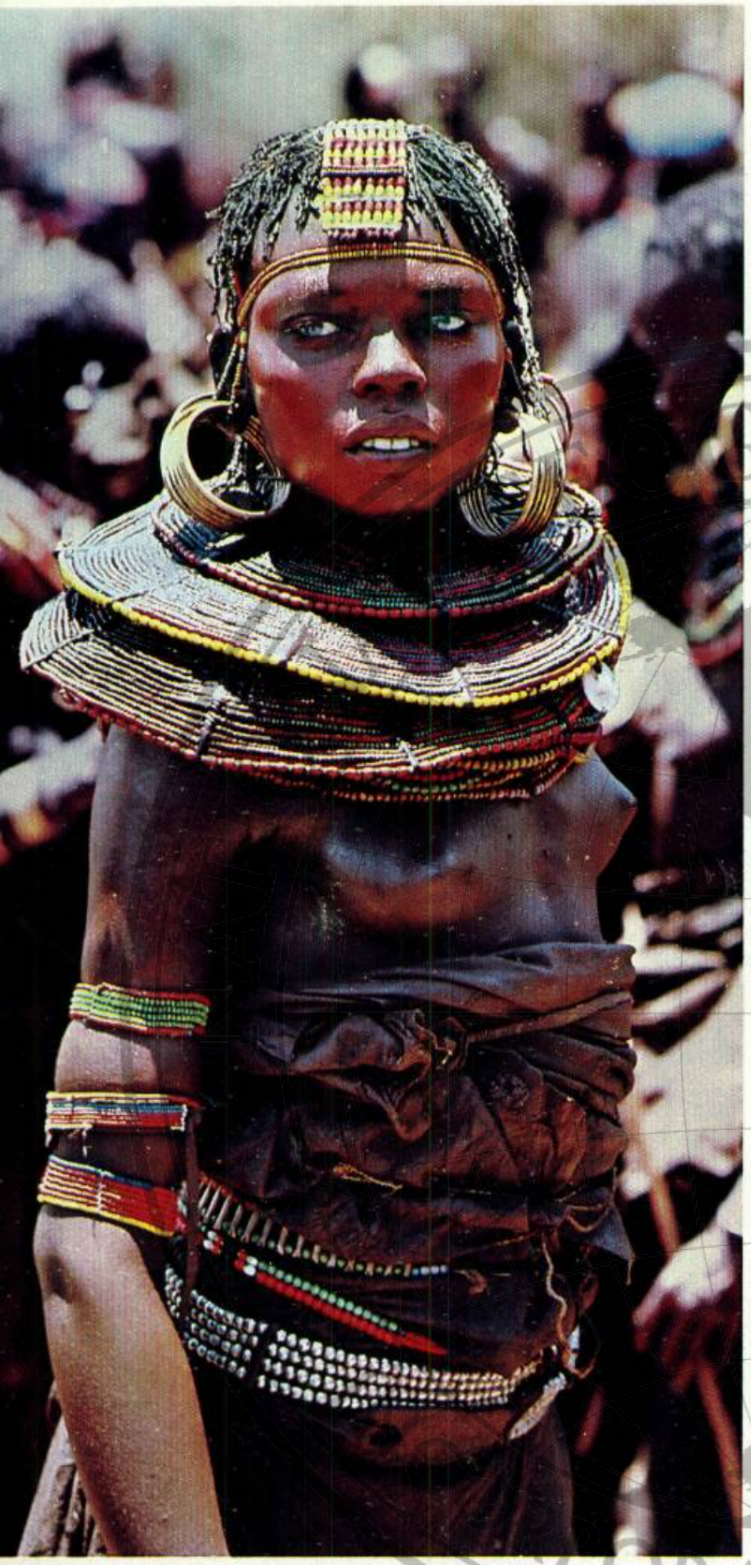

NATIONAL GEOGRAPHIC SOCIETY





East Africa's mighty Rift Valley *spreads broad fingers into the Cherangani Hills (**left**), where those Pokot who farm make their home. Like living scarecrows, farmers keep birds from their crops by hurling stones and mud balls from raised platforms, a daylong chore usually assigned to children. Turning soil that has supported humankind for millennia, a Pokot couple prepare to lay in a crop of maize (**above**). Using simple but ingenious irrigation systems, each family cultivates several small plots at varying altitudes.*

Far out on the open plain, grasslands support the Pokot herders, about a third of the tribe. Though tillers and grazers are closely tied through marriage and trade, the plains Pokot, with their large herds of cattle and camels, are considered rich by their farming kinsmen.



Pokot Vanity Fair: *In her finest beads, and smeared with red ocher and ghee, a young pastoralist* ***(above)*** *turns out for a ceremony. Two women* ***(opposite)****, one wearing her beer bowl as a cap, help each other dress. Elaborate necklaces are daily attire. Those worn before womanhood are made of plain wooden beads.*

in order to keep track of my new vocabulary.

Language, of course, was no barrier to what my eyes taught me. Initially, until I no longer noticed, the women especially seemed spectacular: twisted strands of oiled hair, brass-ring ear loops, bright bead necklaces, elaborate iron and beaded belts, multiple bracelets and anklets of iron, steel wire, brass, copper, and even aluminum. Many had enhanced their beauty by having their midriffs scarified.

The men dressed in cloths tied at the shoulder. Some sported neatly mud-packed hair, and many wore necklaces hung with snuffboxes made of goat's horn.

Hill Farmers and Valley Herdsmen

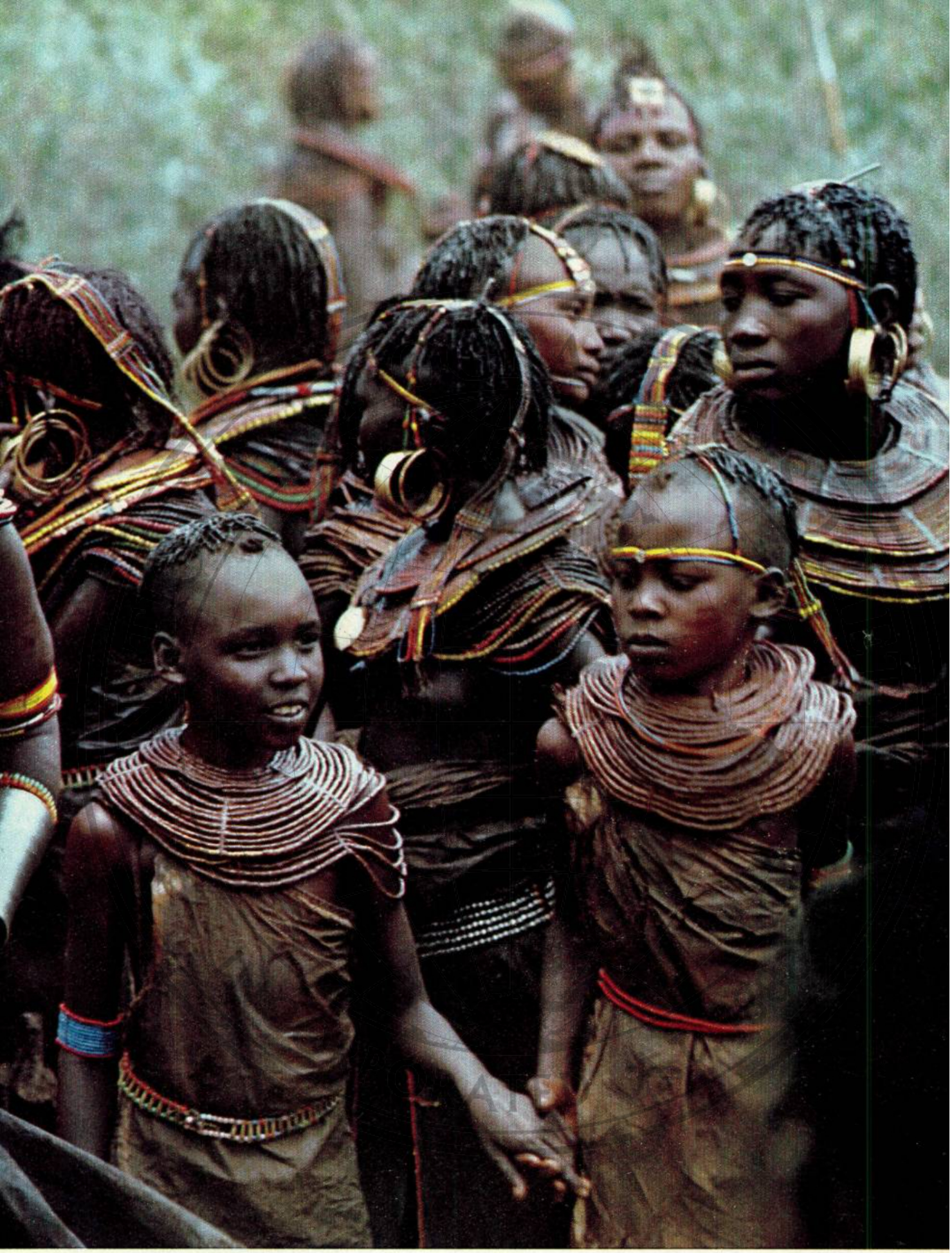
Two-thirds of the Pokot are farmers who live in the Cherangani Hills, where rainfall is sufficient, though seasonal; the rest are pastoralists of the dry plains on the Rift Valley floor. The two groups share essentially the same social and ritual practices, each making up the other's lacks by trading grain for milk and other animal products.

The hills of the farmers at first glance seem grand and steep—the highest rises to more than 11,000 feet. Lush bush clothes them, and cloud or mist often veils them. A second look reveals that up to 7,000 or 8,000 feet they are dotted with individual huts perched on sloping farmland. The huts, 100 to 500 yards apart, group together into distinct communities or neighborhoods. The three or four clans that make up each locality own and farm land near their clustered dwellings. A complex system of marriage and kin ties allows each Pokot family to cultivate fields scattered throughout the area.

To guard against crop failure, each family plants different crops at different altitudes. Men and women share work in the fields, and during busy periods the households of a neighborhood often form cooperative teams working each other's farms in rotation. Some teams put themselves out for hire—the remuneration in beer.

Early one August morning I went to visit KamaCherop (Mother of Daughter of Rain), who lived on the next ridge. I met her as she carried water from the river. Predictably, the flattened area around her hut was chaotic with children milling around among the goats and sheep. Cherop, the ten-year-old

Doing the adongo, *the most common Pokot dance, women face off against the men. In day-to-day life as well, sex roles are clearly defined, with women bearing the greater share of labor. Proud of their physical grace and*



strength, they enjoy the robust display of public dances. "It took me years to jump in time to their complex rhythms," says the author, an American anthropologist who for six years was warmly accepted by the tribe.

eldest daughter, was milking a goat and shouting at a brother to inspect more carefully the ears of the sheep he was de-ticking.

It didn't take long for KamaCherop to cook the morning meal; the maize had been ground the day before. Like other Pokot women, KamaCherop was skilled at cooking *pan*. This staple food among the agriculturists is made of ground grain cooked in boiling water. Using a long wooden spoon, she served the first and largest portion into her husband's tightly woven basket; it would be taken to him in the fields. The remainder was shared out evenly, along with servings of edible leaves.

KamaCherop and I walked down to the valley maize fields, where we found her husband, Morwarengan, busily weeding. Happy to take a rest, he moved into the shade and delved into his food basket.

Conclaves Judge Disputes and Sorcery

Now, in mid-August, most of the weeding was finished. Children could be left sitting on raised platforms to guard the crop against birds. This gave the men a chance to gather to rest, gossip, or do other tasks.

Pokot men, it seemed, always could find time to meet with their friends at *kokwo*, an almost daily council held in a special area under a large tree. Kokwo is a kind of open court for the settling of disputes. At kokwo, as elsewhere, a man should not sit on the bare ground, but on a stone, a skin, or one of the beautifully crafted mini-stools that double as pillows.

Women, for their part, met at the *ghat*, the communal grinding stone under a big acacia tree. The stone was ten feet or more across. On it five or six women could grind grain at once, singing, laughing, and talking for hours. Only at the busiest periods would the women use their small individual grinding stones at home.

The Pokot live by rules evolved over generations to make their way of life secure. They do not condone an individual's resorting to witchcraft or sorcery: Ritual and mystical power—access to the spirits—rests with the community of elders. (Prophets, however, are revered. A community may bring gifts to a renowned seer to learn when the rain will come, how to ensure a good crop, or how successful a cattle raid will be.)

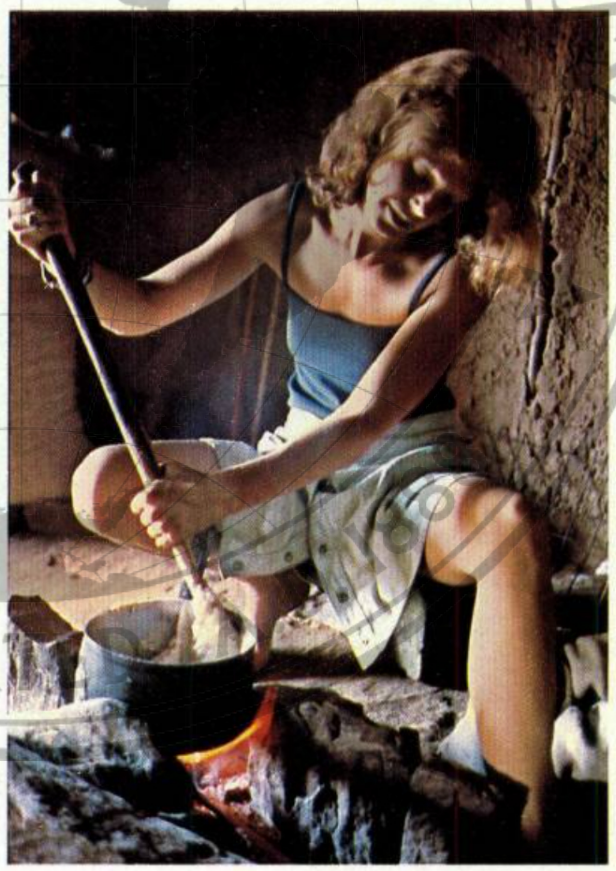
I recall an important kokwo convened to discuss suspected sorcery. It took place down in the valley, under a spreading fig tree. The women attend such serious meetings, sitting separate from the men. Though usually silent at kokwo, they exert a powerful influence at such formal assemblies through gossip and persuasion at home.

A man called Lomuria stood and repeated a curse as each of those present took a sip of beer from a calabash passed around.

"If anyone of you has bewitched the home of Ngolitieng, then die, die soon," said Lomuria. "The old men are saying 'Let disease eat you, soon—tonight.'"

If any man had failed to attend the kokwo or hesitated to drink the special beer, he would be suspect. Everyone knew the beer contained powerful "medicine." One sip was enough to kill the guilty person, though he might sicken slowly, taking more than a year to die.

Ngolitieng rose and recounted in detail



"The woman's traditional place," *says the author* ***(above)*** *of the hearthstone where Pokot wives sit while drying grain* ***(above right)*** *or cooking porridge. In a hut that her neighbors helped*

every aspect of what had happened. A few weeks before, he explained, his brother's baby had died, and then his own daughter had suddenly fallen ill, shaking violently. Ngolitieng had slaughtered a goat, and old men had come to bless the girl. But the next morning she was worse. We drove her to the mission hospital 30 miles away at Ortum, but she died that night.

Everyone present agreed that Ngolitieng had done everything he could for the child. He had not taken anything from anyone, nor had he recently quarreled. Opinion was unanimous that someone had used his evil power to curse Ngolitieng's family.

I was fascinated. Most people thought it was Lokomol who had bewitched his home. Years before, Lokomol had had an adulterous affair with the wife of Ngolitieng's uncle. Lokomol had been fined a large number of goats and cows, paid to the husband. People were inclined to believe that Lokomol still held a grudge against Ngolitieng's family. But no one dared mention this today, aware that if Lokomol was not guilty he would be angered at the false accusation and might then do harm to the person who made it. If, on the other hand, he was guilty, the medicine in the kokwo beer soon would make him sick and he would die.

Nothing, so far as I know, ever happened to Lokomol—but then maybe he hadn't bewitched Ngolitieng's home.

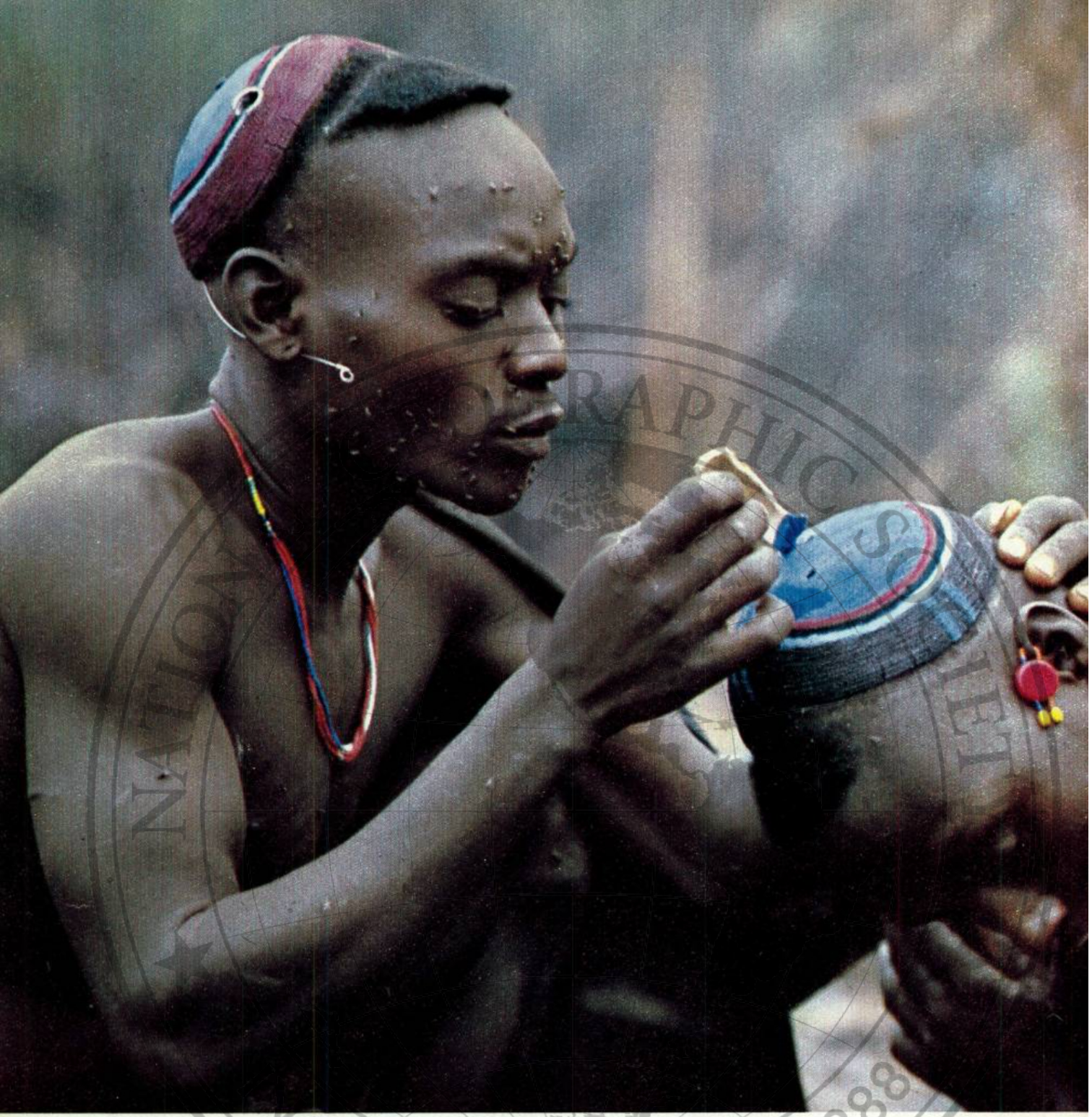
New Father Has a Measure of Doubt

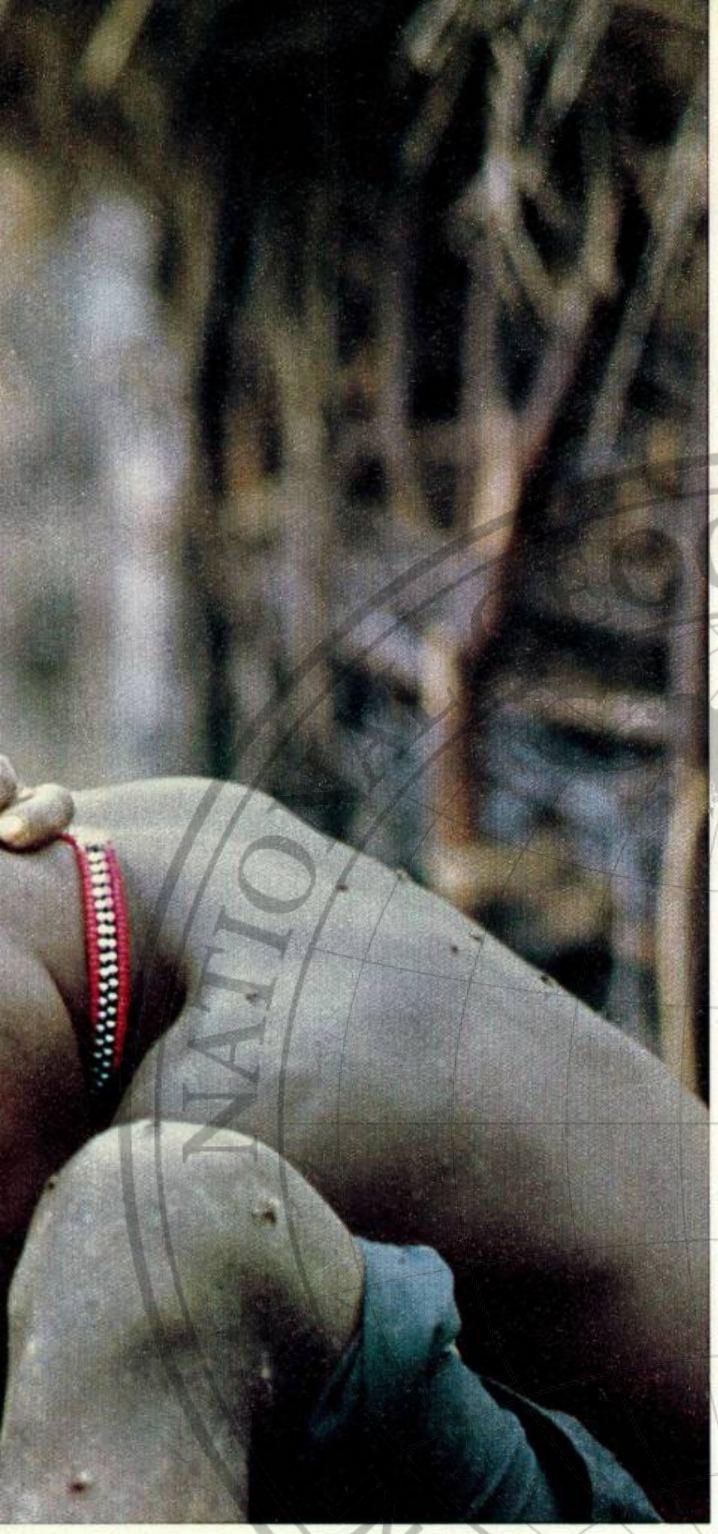
One of the wisest and most respected elders was dignified old Chermit, vigorous despite his years, with a sparkling charm that peeked through in a glance or smile. He became a special friend, and early in my stay the people decided that Chermit should act as my father. I took his clan name.

It was Chermit who advised me that I should marry Murray Roberts, the Kenyan who took the photographs on these pages.

"Whenever your friend comes to visit, you

build, Elizabeth Meyerhoff lived like a Pokot with photographer Murray Roberts, whom she married in a native ceremony. "In true Pokot fashion," she says, "I carried the water, ground the grain, and did the cooking." Meyerhoff, a Ph.D. candidate at Cambridge University, was encouraged to live with the Pokot by the late Dr. Louis S. B. Leakey, who had grown up among Kenya's Kikuyu tribe.





Fancy headwork *occupies fly-bedeviled herders* ***(above)*** *preparing for a friend's sapana—a coming-of-age ceremony that culminates in the youth's first mud cap. Thereafter, increasingly elaborate designs denote membership in various male age-groups. Some men, however, forgo the traditional headdress, which disintegrates in the rain.*

During sapana, participants drink deeply of milk mixed with blood ***(left)****, an important source of protein drawn periodically from their cattle. A rarer treat, meat is enjoyed at ceremonial occasions, when oxen are slaughtered and shared with all.*

become very happy," Chermit observed. "He should give you *trum* [the Pokot wedding bracelet] so that when you go to ceremonies in the surrounding hills, people will know that you are someone's wife." Murray and I considered this, and when I went back to Chermit with a few questions, he only smiled, spread his ten fingers, and pointed to the last joint in his small finger saying, "You have this much doubt in your mind. Go away and think again, then find a goat, brew your beer, and we shall have a ceremony." Chermit had made up his mind.

Motorbike Fulfills Bridal Gift

Our marriage, in the traditional ritual called *nosio,* was a happy confusion, all our neighbors joining in the singing, dancing, eating, and drinking. Twisting a strip of leather around the wife's wrist climaxes a Pokot wedding. A woman acquires a trum bracelet only after she has been promised or given gifts, usually land and livestock from her husband's family, which she will later pass on to her children.

With my trum, Murray promised me a variety of animals and other gifts, later consolidated in the form of a motorbike! The Pokot had hoped I would receive an automobile so that we could drive people to the hospital.

When Murray and I finally were able to afford a car, it became Chepoptukoi's ambulance and means of transporting goods to the weekly market at Sigor. It opened up other Pokot areas, like the communities of pastoralists on the plains to the east. The Pokot upland farmers regard the pastoralists as wealthy and leisured folk; they don't have to endure endless stooping to work the soil. Although the herds of the mountain farmers consist mainly of goats and sheep and only a few cattle, each pastoralist family owns a large number and variety of livestock, and sometimes hundreds of cattle.

All Pokot revere—almost idolize—their cattle. A man improvises songs about his most prized ox, extolling its size, color, and the shape of its horns. Every important transaction is sealed with the exchange of stock. For the pastoralists, of course, cattle are fundamental to their survival—the basis of all economic and social life.

The herders' environment on the whole is far harsher than that of the farmers. In their

hot, parched world, people usually must dig for water during the dry season, which may last five months of the year. Their semiarid territory—part of the Rift Valley floor—supports low acacia and shrub, with grass growing only during the rainy season.

For most of our months among the pastoralists, Murray and I lived near Tangulbei in the compound of Limangura. His homestead consisted of thatched huts with several kraals grouped around. Fenced with cut thornbushes, each enclosure gave night shelter to one of his herds—cattle and donkeys, camels, goats and sheep, and calves.

Limangura had three wives and seven children. Then there were his mother, the wife of a man with whom Limangura had often exchanged stock (her husband was frequently away at outlying cattle camps), Limangura's sister (visiting temporarily after a domestic quarrel), the various children, and of course livestock. Yet the place was functional and ordered. Each family unit had its own hut, every herd its own space, and each member—even the youngest—his or her responsibility.

Full Household Shares Daily Round

As among the farmers, pastoralist women are allocated enough stock at marriage to take care of their needs. This stock is passed on to their sons, who may eventually use it as part of the bridewealth paid to the wife's family when a man marries.

On a typical day women and older girls rose just before dawn to milk their cows and camels. Each woman fed her own children, usually just milk, but occasionally some grain porridge as well. A small portion of milk was always saved for us. When Limangura was there, he would eat with the wife he spent the night with. By sunrise most of the stock had been let out to graze. Limangura and other men from the neighborhood would usually leave their compounds in the morning to check cattle or sit under a tree and talk with friends.

I would keep the women company at their chores. Hands kept busy with sewing and repairing skin skirts, utensils, and intricate female adornments, or making the clarified butter called ghee. The women loved listening to my tape recorder, especially to the songs from what they regarded as "my country"—not America, but the homeland of their farmer cousins a hundred miles away in the Cherangani Hills.

Cattle raiding still is a real threat among the Pokot, despite the Kenyan government's efforts to stop it. The devastation of war in Uganda and Ethiopia and the recent severe drought in East Africa have fostered new outbursts of armed theft. With modern weapons available, raiding today is far more serious and potentially deadly than when it was fought with spears and bows and arrows. A pastoralist family can lose all its herd animals in a single day—and without livestock, a family cannot survive, nor can the culture that revolves around it.

During our visits with the pastoralists, no day went by without an exchange of words on cattle raids—past, current, or threatened. More than once we had to shift camp because raids seemed imminent. But the boys and young men moved about confidently with the cattle, breaking up the herd as a protection against disease and to seek grass and water in areas considered safe.

In their temporary camps, sleeping in the open or under skin mats or foliage thrown over a few upright sticks, the herders lived off milk and blood. Every two months or so a steer is bled from a vein in the neck, yielding two to four pints of blood.

The months—and years—among the Pokot passed as we followed the cattle, tilled the watered fields, danced, and shared food around a hundred fires. But certainly Pokot initiation left in our minds some of the most lasting pictures.

Coming of age for Pokot boys and girls entails acceptance of long-established rituals. Both sexes eagerly anticipate these rites of passage to adulthood.

The timing differs for male and female initiation, but the sequence and content are basically the same. A two- or three-month procedure, it starts with circumcision for the young men and women. A long period of seclusion follows, leading up to a public celebration, where the participants are presented as new adults.

Immediately after initiation, the way is open to a Pokot woman to marry and bear children. Most men, on the other hand, cannot marry for several years after initiation, for it takes time to accumulate

sufficient livestock to pay bridewealth.

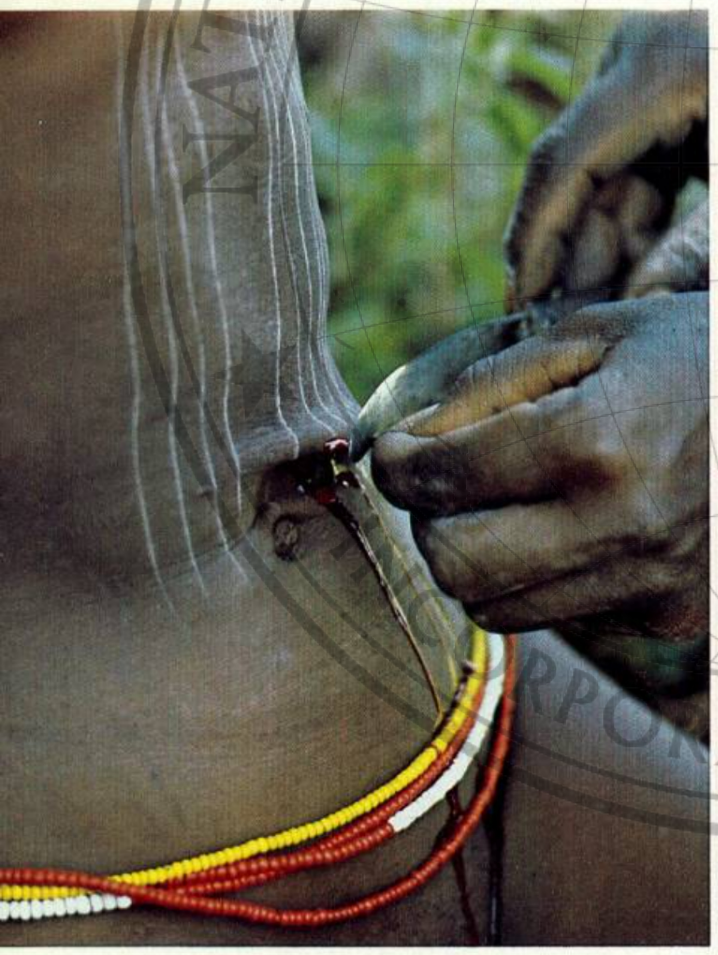
Pokot women always spoke to me with great pride about their initiation rite: "It makes girls into women," they said. The older women organize and control female initiation, which takes place in different neighborhoods every year throughout the Pokot region. By the time a girl reaches puberty, she becomes anxious to be initiated and may even do so against her parents' wishes. She and her girl friends usually decide to go through initiation together.

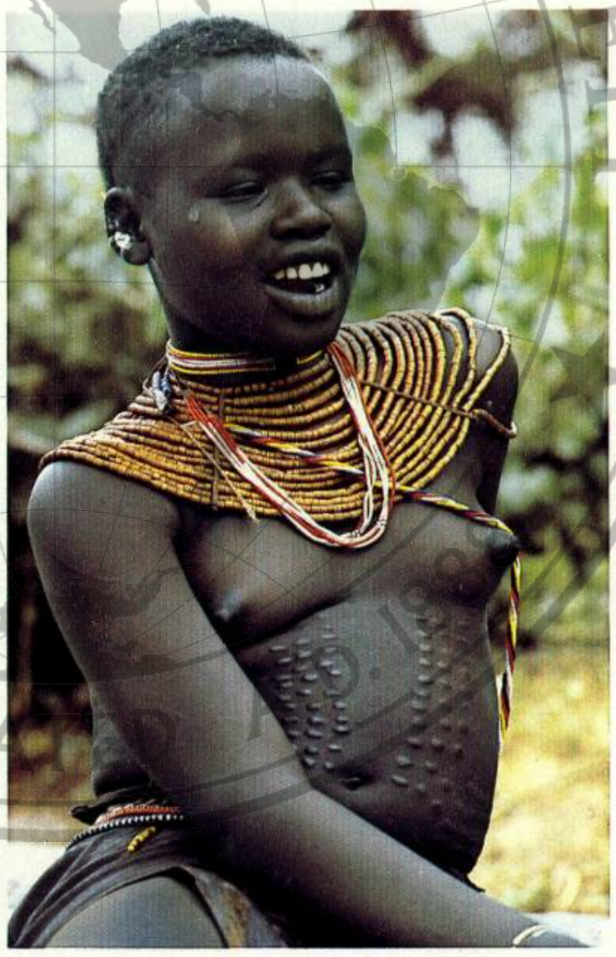
During the quick circumcision operation, publicly performed by an experienced older woman, the girl must not flinch. Having withstood this ordeal, she becomes the pride of her family and neighborhood. As the initiate walks home, the women sing songs celebrating the honor she has done her family.

The family hut to which the initiate retires is taken over by the community women. The period of semi-seclusion begins. The father of the initiate must vacate; his daughter may not see him or certain other close male relatives for the two to three months until the final coming-out ceremony of *kipuno*.

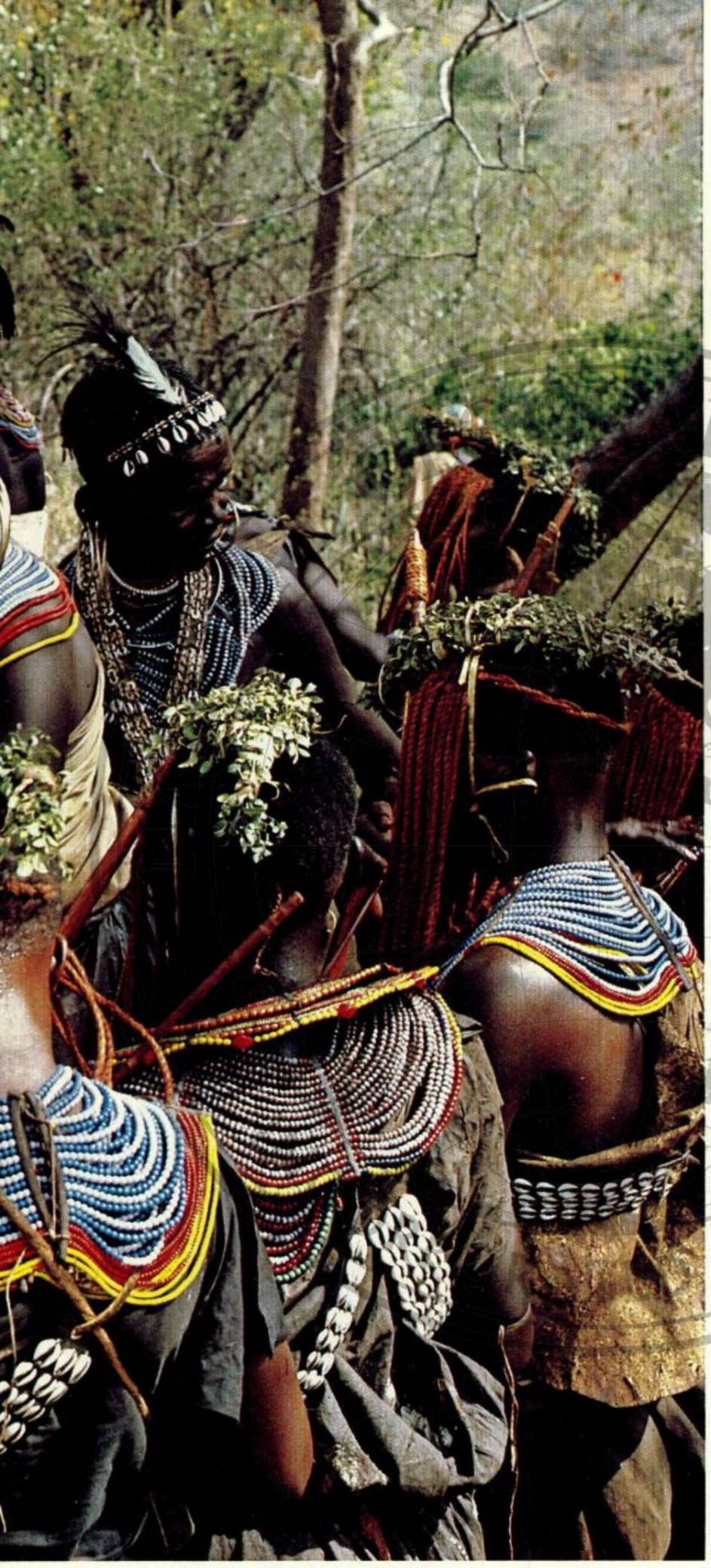
In the interim the initiate is known as a *chemerion,* neither a girl nor yet a woman. For the first few days the chemerion covers her face with ash and rests, being attentive to special evening songs the women sing to her. After about two weeks, when her circumcision scar has formed, she and her fellow initiates go into the hills to collect white chalk. Each morning the chemeri smear their faces and bodies with a mixture of water and white chalk; this and loose hide cloaks obscure their identities (page 138).

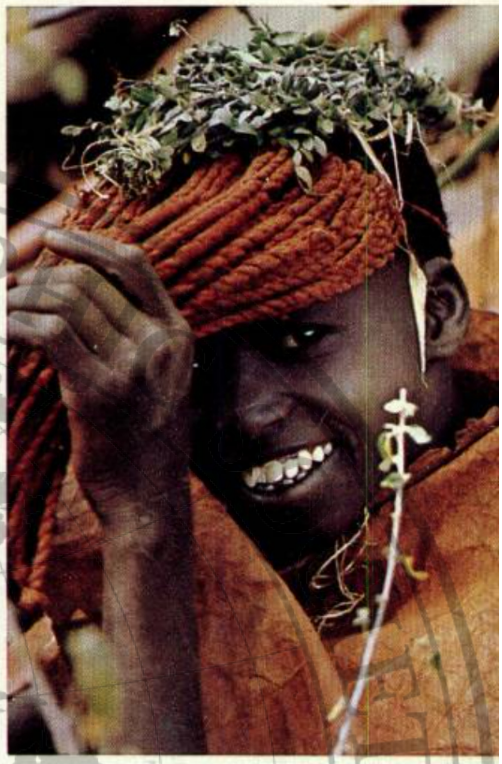
I recall the evening before kipuno at P'Simat in the Cherangani Hills. For the night's celebration it was young Chesinen's turn to furnish a feast of goat and maize for the old women, just as other chemeri had done. The men could hear the singing and





Beauty marks *in the eyes of Pokot beholders, scars decorate a girl's midriff* ***(right)****. Fingernail scratches mark where pinches of flesh will be cut* ***(left)****, traditionally on the stomach, occasionally on the back and waist. The wounds heal in about a week, the pain willingly suffered for cosmetic appeal.*





Behind a rope mask, *which conceals his identity, a Pokot boy* ***(above)*** *becomes a man after a three-month seclusion following circumcision. He and his friends* ***(left,*** *backs to camera) receive blessings from married women, whose skin robes and ornaments the boys borrow for the coming-out ceremony. Though the reason for donning feminine attire is unclear, it may be done to reinforce respect for women, marriage, and motherhood. Through such rituals, the Pokot cement bonds between sexes, neighbors, and clans.*

festivity but they kept well away, knowing they would be bombarded with obscene jokes and gestures if they dared intrude.

On the morning of kipuno we all went down to a certain shaded area in the valley. Each chemerion was made to kneel, bending over and burying her face in her hands. Like her friends, Chesinen had to hold herself stock-still as her mother disclosed to the assembled women personal details about her daughter's character.

"This is a bad chemerion," KamaChesinen said. "My daughter is really bad. She has a big mouth. When she marries someone, won't she take all those words with her? Now she will be away from my arms, and her husband will just beat her right away."

The old women took up the theme, quickly telling Chesinen how she should behave if she intended to stay married. KoChepkech ("Ko" means "grandmother of") summed up: "If you marry someone," she said, "follow the words of that home. Do what you are told. Obey the one you marry."

Wife Obeys—With a Loud Voice

Just before Chesinen was allowed to stand, her mother, seeming to relent from her earlier tirade, turned to her with these words: "I say, my daughter, you have no mouth when you are a chemerion. But soon you should speak as I do—with a loud voice like mine, just as women do."

That morning gave me a sharp insight

Flowers about to bloom, *girls come of age beneath chalk disguises during weeks of confinement and instruction. Beginning with public circumcision, the puberty rite ends when initiates emerge as new women at a group coming-out ceremony* ***(right)****. Most likely, they will be wed within a few days. In the past year, as pressures have grown for the Pokot to participate in modern Kenyan society, many have adopted Western dress. But, says the author, "the rituals and beliefs that sustain Pokot culture may not so readily expire."*

into Pokot women's awareness of seemingly contradictory themes in their society: In their initiation rite, on the one hand they express an acceptance of the social ideal of obedience to husbands and fathers, while on the other they assert their strength and solidarity as a group, with individual power to use their sexuality as they see fit.

Now came the time for the chemeri to bedeck themselves for kipuno. A crowd gathered at P'Simat's dance area. From miles around people had come adorned in their finery to honor the initiates' bravery and to dance to jubilant songs.

None of the guests, though, could match the grace and radiance of the "new women" when they joined the dance circle. Their bodies glistened with ghee, every ornament hung in place, and their bright bead necklaces glittered in the sun. They danced with an air of aloof pride, but the excited crowd set the overall mood of celebration.

Four more days would pass before the end of initiation. Chesinen and her sister graduates spent three of them visiting male relations who blessed them and promised gifts of livestock. On the fourth day, a final, very private ceremony took place that knotted the ritual bond between the older and younger women of the neighborhood. That very night many of the initiates went as brides to their husbands' homes. There they would raise their families and, in coming years, teach their daughters, as would the men their sons, the elaborate rites that reaffirm traditional Pokot ways.

Western Influence Growing Stronger

Such a cultural continuation may be a fading dream. The Pokot are under pressure to assume a more active, participatory role in modern Kenya. New roads cut through their homeland, from both east and west.

Although the Pokot have withstood acculturation, their indifference has been shaken by the recent drought and raiding and by ambitious development plans. But to assume that life among the Pokot could, or even should, remain unchanged is unrealistic. I only hope that modernization will be carried through with an understanding of, and sensitivity to, Pokot beliefs and values. If not, the dignity and pride of the Pokot people may be crushed and lost forever.

I was soon to leave his land when old Chermit, my Pokot father, died minutes before I could reach his hut. His wife I found sitting on one of his favorite stones, looking out across the valley. No wailing. No display of grief. She was simply silent.

The past two years I have spent in England at Cambridge University completing work for my doctoral degree. News of the Pokot comes in letters from Murray, who sometimes visits the area, and from Yohana, a Pokot boy I am putting through school in Ortum. Murray's latest letter was disturbing: When he recently went to Chepoptukoi, he found that all our friends and neighbors there were in Western dress—difficult to imagine, yet I know it's no use lamenting the transformation.

Change Is Fact of Pokot Life

We had already observed changes in dress and an influx of Western goods when living with the agriculturists in 1979—a momentum of progress we knew would increase. The Pokot are not strangers to such influences: Mission and government posts have been established in the area since the early 1900s. But now the pressures to modernize are greater, especially among the agriculturists whose region the new roads have made much more accessible.

I remember, when Chermit died, feeling that an era had ended. But such a thought would have angered Chermit. Profound and proud, he knew how to adapt to change. Like him, some of the educated young Pokot —Yohana, for instance—are beginning to see not only the beneficial aspects of Westernization but the enduring values of their own culture as well. The future is theirs.

The Pokot word for good-bye also means "thanks." I never got to say good-bye to Chermit, but then I never said good-bye to the Pokot either. I hope I may say thanks, though, by playing a positive role in their future, helping to bridge the gap of understanding between our ways and theirs.

I feel lucky to have shared in the richness of the Pokot world. I often remember Chermit's giving the words of traditional blessing, each phrase repeated by everyone present: "The stars are hearing, the earth is hearing. The people are hearing—all is well, good, sweet. Then laugh, laugh, laugh." □

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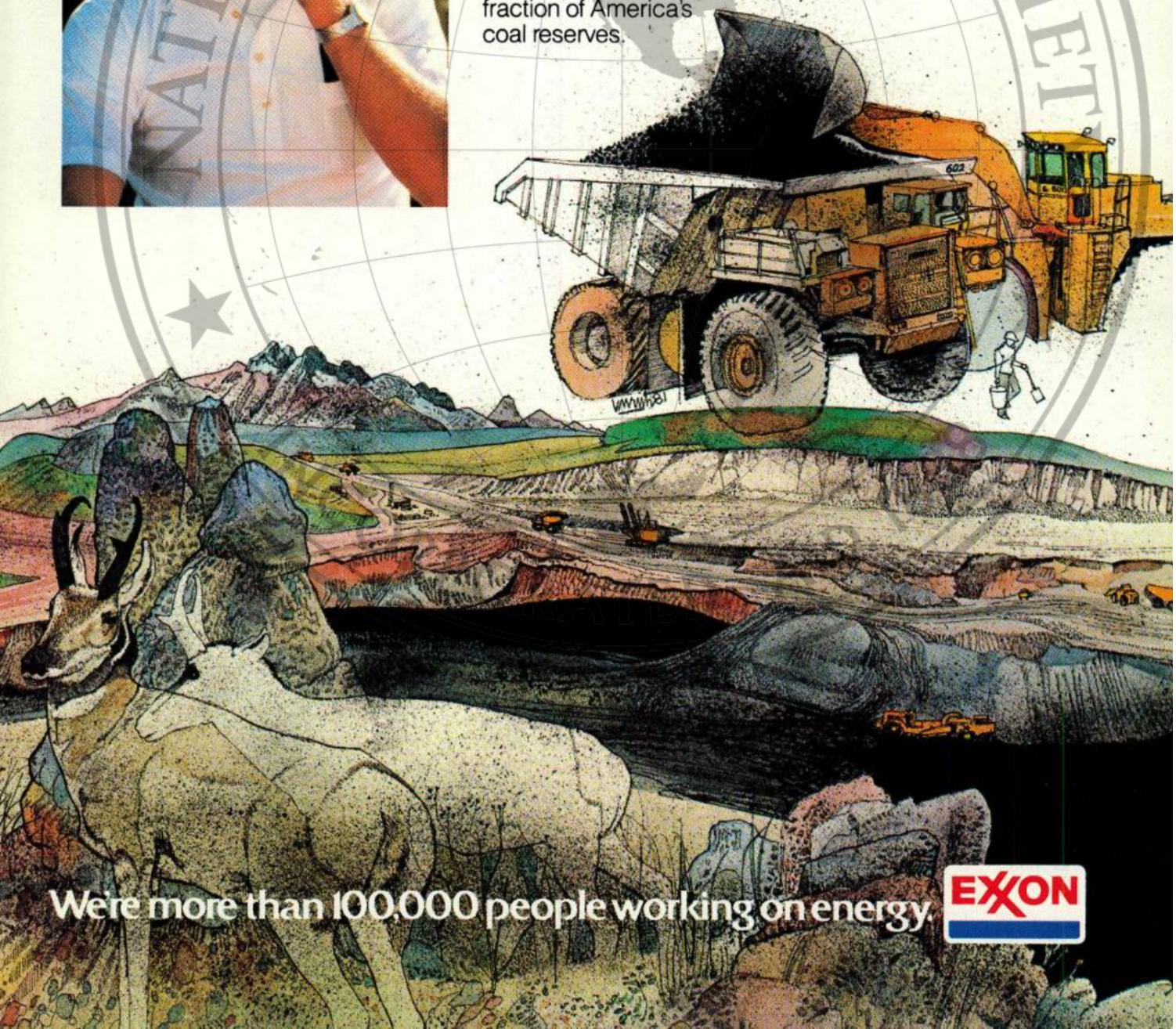

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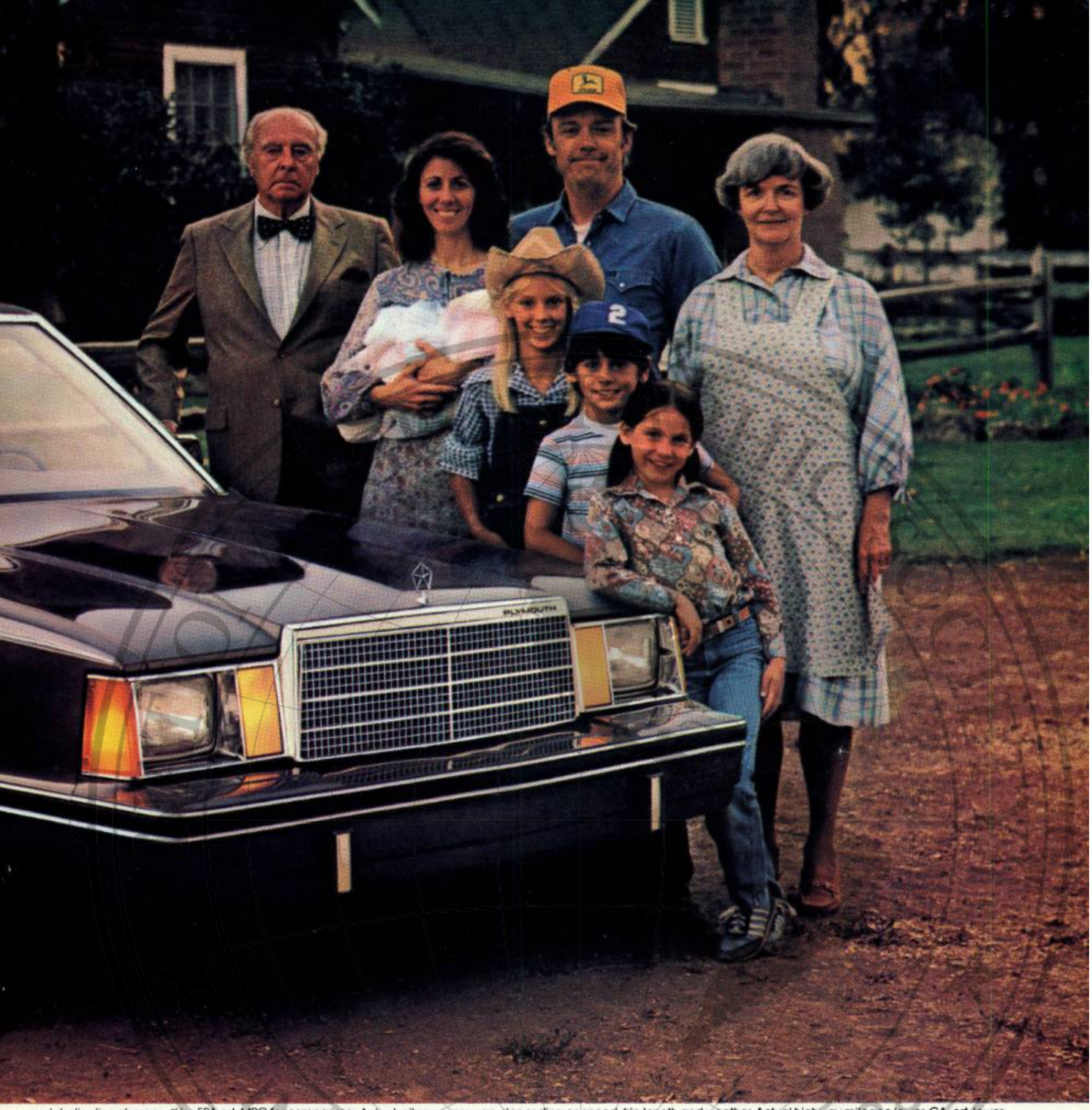

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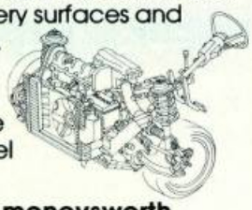

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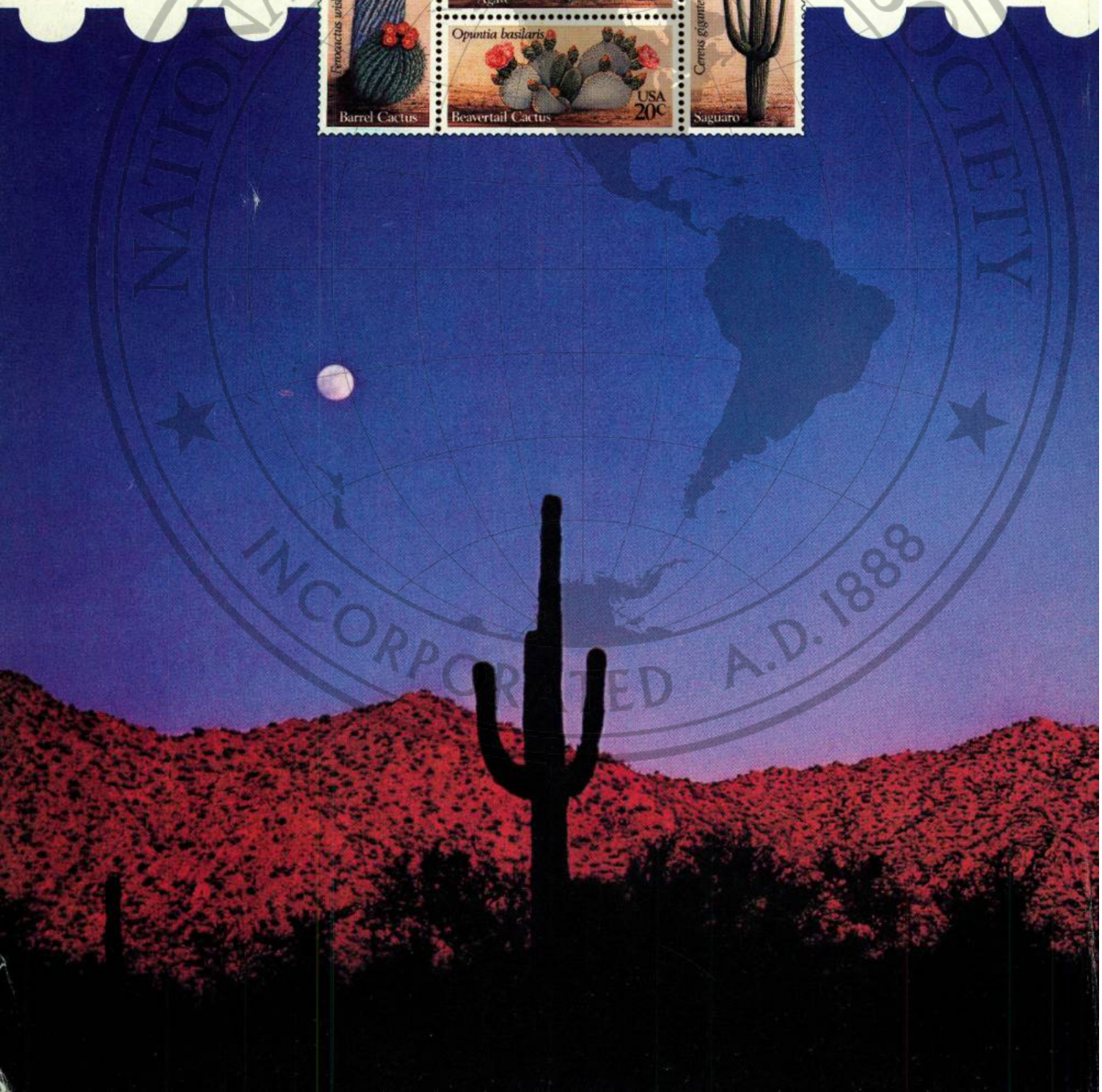

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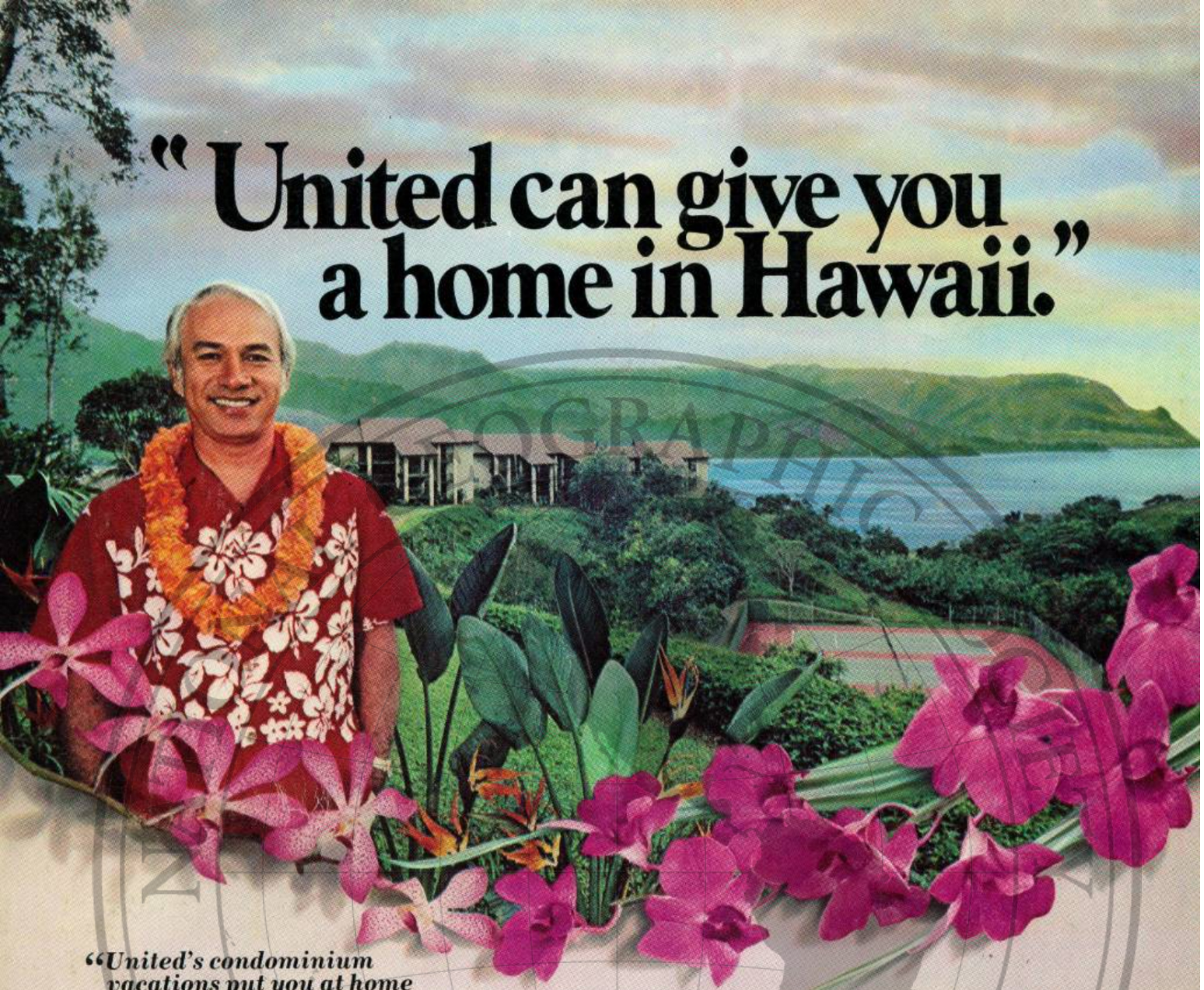

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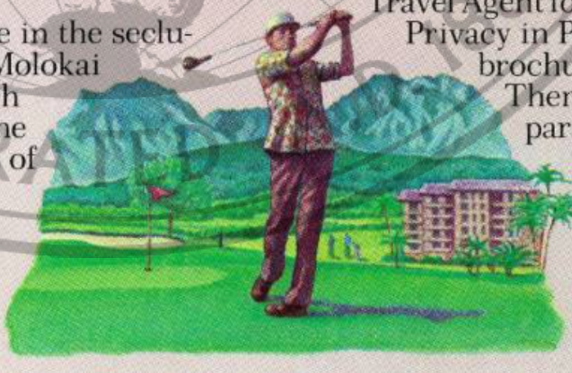

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